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floating & CLIPPING

Woven Textiles with Weft Floats and Finishings by Clipping

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abstract

This thesis reviews woven textiles using weft floats and finishings of the fabrics by clipping. The study examines the industrial production process and finishings of clipped fabrics, maps out the fil coupé fabrics in fashion and furnishing markets and provides a historical review of brocading and figured weaving with floats. The purpose of the thesis is to examine the application of the idea portfolio into industrial manufacturing of woven textiles. The design development process takes place in collaboration with the Italian weaving mill Lodetex and meets its context in the past, present and future.

The practice-led research method of this study is to develop sketching methods for designing clipped fabrics and to create an idea portfolio in order to demonstrate the appearance of this type of cloth. The idea portfolio supports the dialogue between a designer and the technicians in a design case. The study describes how to concretise a fabric design by producing a handmade sketch and how to improve the design onwards into industrial production.

Researching historical data and considering the position of the present market brought a profound understanding to the topic. Considering brocading in the past and clipped fabrics of today, there are few differences. Brocading has been used for conserving the material consumptions. Clipping today is used to add value by a highly decorated appearance of the cloth.

The thesis provides the technical knowledge, describes the creative process and offers new fabric designs to Lodetex. The collaboration with the weaving mill and visiting the finishing company provided valuable knowledge. The weaving mill and the finishing facilities not only set up certain limits but also opened up new opportunities for weaving. The skills in abstract thinking and the technical understanding of the phases and the requirements of production play a significant role to the designer. The ideas that evolved from the technique and the sketches, generate the idea collection of clipped cloths. The idea collection provides new ways of thinking when it comes to clipped designs. The intersection of knowledge, material thinking, experience and creative work affected the outcome of the idea collection.

This study states the various opportunities when designing clipped cloths. The development of clipped cloths in industrial manufacturing may be considered as a work of art. Considering the woven textiles and the different finishing methods for these fabrics, the aesthetic values and the technical skills play a significant role in both.

thank you

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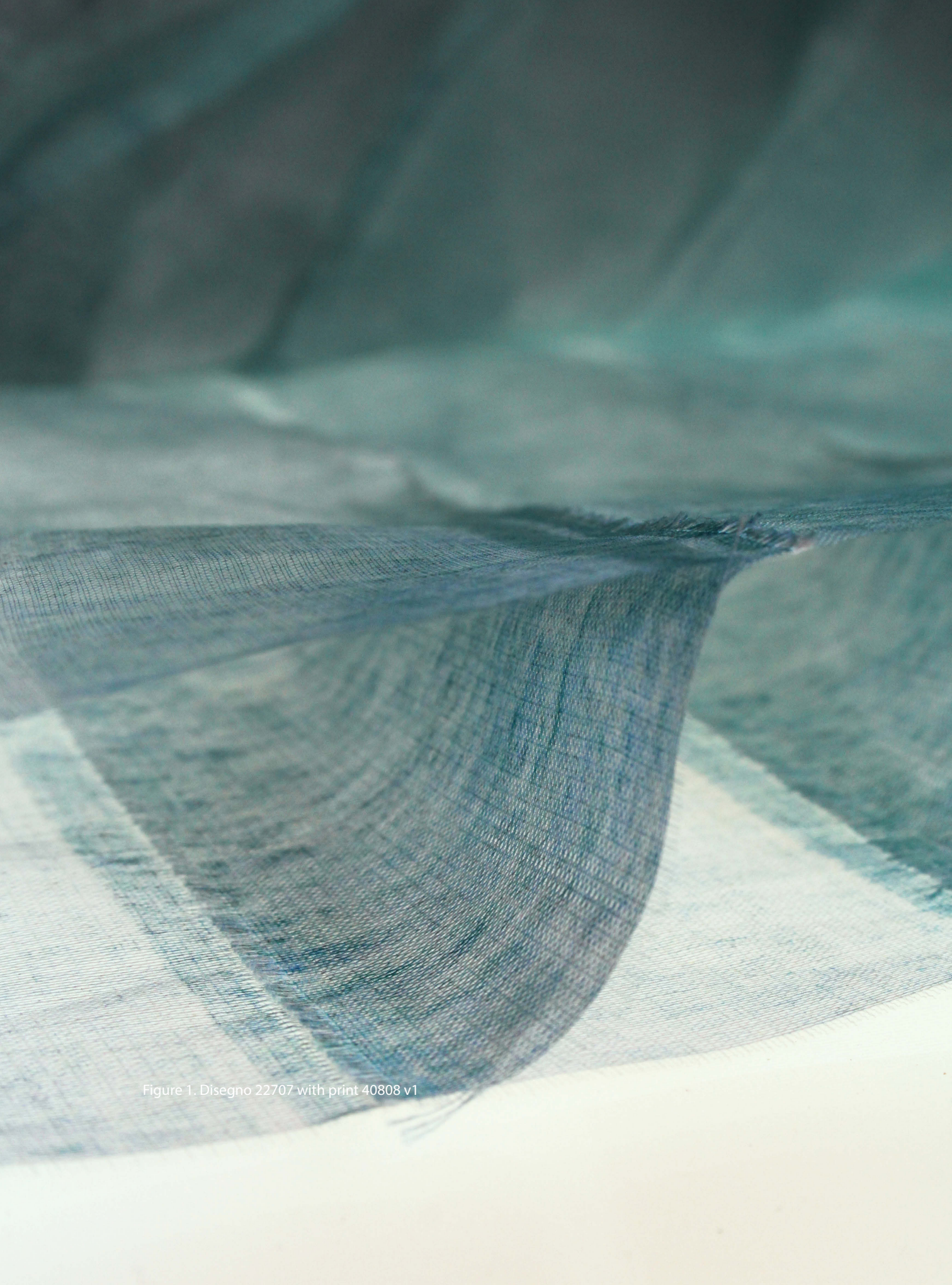


Figure 1. Disegno 22707 with print 40808 v1

INTRODUCTION

This thesis explores how to design clipped design weaves. The study reviews how to concretise a fabric design by producing a handmade sketch and how to improve the design onwards into industrial production. In this practice-led research, the design development process of clipped cloths explores its framework in the past, present and future.

Purpose Statement and Research Questions

My master's thesis, Floating and Clipping, studies textiles using weft floats and finishings of the fabrics by clipping. The practice-led research method of my study is to develop sketching methods in designing of clipped fabrics and to create an idea portfolio in order to demonstrate the appearance of this type of cloth. The purpose of the thesis is to examine the application of the idea portfolio into industrial manufacturing of woven textiles. The idea portfolio supports the dialogue between a designer and the technicians in a design case that

takes place in collaboration with the Italian weaving mill Lodetex. The study examines the industrial production process and finishings of these fabrics, maps out the fil coupé fabrics in fashion and furnishing markets and provides a historical review of brocading and figured weaving with floats.

My purpose is to research and analyze the following subjects (research questions) which are closely related to jacquard weaving and finishings of the fabrics:

1. *What is the present position of fil coupé fabrics in fashion and furnishing markets and what kind of paths are found from past to present considering the development of brocading?*
2. *What are the phases of production and the requirements in weaving and finishing of clipped fabrics?*
3. *How can new ideas be evolved from the technique and adapted to the industrial production?*

Background

The topic of my master's thesis evolved not only from my own interest and fascination of jacquard weaving. A little bit of luck contributed to the final outcome of this study as well. At an early point of my study, I wanted to discuss the material and colour design of woven textiles. I considered various ways on how to approach the subject from a fresh and meaningful point of view.

In the beginning of the spring of 2014, I spent three months on an internship at the Italian weaving mill Lodetex. Lodetex is specialized in the production of jacquard fabrics for furnishing markets. I decided that doing my thesis in collaboration with Lodetex would be a viable continuum after working in the company as an intern. I discussed the matter with owner Luca Farhanghi and he agreed that a thesis collaboration would be interesting and beneficial for the both of us. He informed me about a few production lines that the company planned on developing. One of these lines related to clipped designs. To me, the development of clipped designs seemed like a fascinating and interesting topic to research. Since I had already designed two clipped designs during my internship, I realized that the weaving process of these fabrics required more advanced technical understanding in interwoven structure of cloth. Therefore this project gave me a chance to improve my skills in artistic expression as well as develop my knowledge in designing, weaving and finishing of clipped cloths.

Significance and Context of the Study

In this study, I have applied a practice-led research. I chose practice-led research as my research method because I was not familiar with the industrial production and constructions of clipped designs. By creative practicing I gained a deeper understanding and new insights into the technique of floating and clipping. The creation of an idea portfolio by using various sketching methods and the development of the designs for production, represent an instrument in this research. In this study, creative activity meets theoretical background.

The focus of the study is on researching po-

tential methods in designing clipped designs and examining the technical requirements regarding the production of these fabrics. Thus, the study consists of three parts; theoretical research based on previous studies and literature, creative activity in the design case including developing from concept to design and production, and finally the presentation of the final collection of woven fabrics. The intention of the literature review is to provide historical background to the topic and map out present markets of clipped cloths. The aim in the design case is to explore new ideas, engage them into industrial production and provide technical knowledge.

To generalize the scope, the approach in this study affiliates with designerly thinking. Susan McLaren (2015) reviews the concept as following:

“through designerly thinking we develop the ability to challenge the past and scrutinise the present and create the future. Designerly thinking encourages us to have ideas, be playful with purpose and spend time in useful fun. Designerly thinking allows us to take on challenges – , grow our ideas and arrive at potential solutions”. (2015. 1.)

McLaren's thought clarifies the importance and the motivation for this study – to be creative and to evolve ideas with a purpose. Moreover, to evolve ideas for Lodetex's needs and my improvement as a designer.

Recently, the debate about technical understanding and material knowledge in the textile and fashion field have become more common. In 2014, along with Aalto University's degree reform in ARTS, the master degree programme in Textile art and design and the programme in Fashion and clothing design were knit together. Reforming allows for a more multidisciplinary and unique education in fashion and textiles. Furthermore, students from Aalto University have recently been awarded in widely recognized international fashion and design competitions. The jury has praised and commented especially on the profound skills in technical structures and unique artistic expression. Delivering a deep understanding of structural woven textile design and production of cloth in an industrial scope has become an even more significant part of the textile and fashion education at

Aalto University.

Recent thesis studies related to woven fabrics or practice-led research in Aalto University

Contract textiles, sustainability and artistic expression have played a significant role in key questions of recent thesis studies related to woven textiles at Aalto University. Practice-led research as a method has been used, for instance, in studies of ceramics and industrial design.

Studies about textiles in public spaces analysis several requirements and functional properties of contract textiles from the point of view of the designers. Aoi Yoshizawa (2014) analyses the requirements of contract textiles by creating a collection of fabrics for public spaces for the Swedish weaving mill Svensson. Carmen Brecheis (2013) investigates the field of contract textiles in the development of self-supporting upholstery from the perspective of a textile designer. Victoria Fislage (2012) examines the choice of material qualities, describes the contract textile business and investigates the dialogue between textile and interior professionals. Her study describes the decision-making process when creating contract textiles for airport terminals and the lack of collaboration and material knowledge among stakeholders. Fislage concludes, that textile and interior designers must improve their collaboration in the interest to close the existing gap of material knowledge.

The sustainability issues have been widely researched in recent thesis studies. Heini Ruuskanen (2011) examines the collection designing of woven fabrics from the perspective of sustainability and cradle-to-cradle concept. Ruuskanen's research is a case study, in which she has designed a jacquard collection for Austrian weaving mill Backhausen and in which she analysis the challenges of sustainable development when designing fabrics for furnishings.

The exploration of artistic expression and the design process occurs in the field of woven textiles. Dorothea Rosenstock (2013) examines her own artistic expression by using hand weaving and painting as a method for the study. Rosenstock looks closely at the threats, structures and rhythms of weaving as an artistic form of expres-

sion. Hanna-Kaisa Korolainen (2015) studies ideas that come from the techniques that great artists have developed as a result of their artistic expression. She has used artistic techniques inspired by world famous artists and created a print and fabric collection.

The practice-led research method has become more common during previous decades and it has been used in design fields such as architecture, industrial design and ceramics. Antti Kienanen (2014) studies the industrial design development process through practice. Maarit Mäkelä has studied practice-led research as a method in her multiple inquires and explored her own artistic expression in ceramics. In the field of textile and collection design, practice-led research is turning out to be a useful method in research and theorization.



Figure 2.

Chapter I

THEORETICAL BACKGROUND : *literature review*

The purpose of the literature review is to provide a theoretical and historical background to designing, weaving and finishing textiles using weft floats as a means of adding texture and design.

The first section reviews the definitions for the thesis's central terms. The purpose of the section is to provide a background to the topic by introducing the nomenclature and terms of figured woven fabrics with weft floats and to review the purpose of clipping and other finishing treatments of woven fabrics.

The second section examines brocading and its purpose and development in figured silk weaving. The aim of the section is to understand why and how this time-consuming weaving process has been used in the past and how it differs from the present.

The third section maps out today's market and the business of fil coupé fabrics. It provides a short cross-section of today's products and discusses the role of weaving mills, finishing companies and textile editors in manufacturing and supplies.

The first chapter aims to answer the first research question:

1. *What is the present position of fil coupé fabrics in fashion and furnishing markets and what kind of paths are found from past to present considering the development of brocading?*



Figure 3. Brocaded silk tabby with tassels from the 18th century (Courtesy of Société Le Manach).

Floating the Weft and Clipping the Float

It is essential for structural reasons that textiles with weft floats are woven with the ground weft and the supplementary weft. The fabrics using weft floats, in which the floats have been cut out, are commonly called *fil coupé*, *de coupé*, clip designs or clipped designs. In the past, these fabrics have been called brocades. Brocades were originally woven with a true brocading weft without any floats. Today the term brocade often describes a particular fabric decoration. However, literature suggest that continuous brocades with weft floats relate closely to *fil coupé* fabrics, unlike discontinuous brocades, where weft floats do not occur.

Ground Weft and Supplementary Weft

When designing fabrics with weft floats it is crucial to understand the function of the ground weft and the supplementary weft. The functionality of these wefts enable weaving the fabric with long floats. The ground weft interlaces with the warp and creates the ground weave. The supplementary weft creates the figuring on the surface of the fabric. Julie Holyoke (2013) illustrates the weft series and its function as following: The ground weft constructs the ground weave of figured textile and if any pick of the ground weft is removed, a void is created on the surface of the fabric. The supplementary weft creates figuring on the textile's surface, but does not engage to the foundation of the ground weave. If the supplementary weft is removed from the fabric, it does not cause a void in the ground weave but will produce irregularity in the patterning. (Holyoke 2013, 130-131.) The function of the ground weft is to construct a cohesive structure and the body of the fabric. This enables the supplementary weft to travel loosely and create intervals or floats between the decorative motifs of the pattern.

According to literature about woven textiles, the nomenclature of the weft series varies. The ground weft is also commonly called foundation weft or main weft and the supplementary weft is

also called extra, additional or pattern weft.

Brocade

The material and look of the fabric assist when defining a brocade (fig. 3.). However, the definition rests primarily on the interwoven structure of the cloth. Brocade is a figured woven fabric. It is a detailed decorated fabric, which is woven with a ground weft and a supplementary weft for patterning the figures. Brocades are also described as continuous or discontinuous brocades.

According to CIETA (2006), the term brocade as a noun, is used for any rich figured textile. It is also applied to any textile with a woven pattern, especially one with a pattern in gold or silver. Consequently, CIETA recommends to use the term with a precise connotation, e.g. silk brocade or brocaded damask. Hence, the ground fabric exposes what type of brocade it is. Brocade, as a verb, describes weaving with a true brocading weft, which is limited to the width of the motif and which does not travel from selvage to selvage (CIETA 2006). The linguistic meaning of the word clarifies the essence of brocade. The name brocade comes from the Italian word 'broccatto' and means embossed cloth.

In general use today, the term brocade may describe only a particular incidental decoration of figured fabric, instead of the fabric's interwoven structure. During the late 19th century and the early 20th century, brocade was commonly used to designate any highly figured cloth (DATS 2015), especially cloth with a pattern in gold or silver. Leimoni Oakes, a textile and fashion historian, defines brocade in her blog Dreamstress as a "fabric with an elaborate embossed or embroidered surface effect, usually with different ground and pattern weaves". She writes that the term brocade today, often describes the aesthetic of a fabric i.e., "unlike damask, brocades are not reversible". (Oakes 2014.) Therefore, the brocade fabric is identifiable from the reverse side.

However, some sources define brocade as a



Figure 4a. La trame liserée: linen and viscose alternate as ground weft and supplementary weft.



Figure 4b. La trame lancée floats on the reverse side of the fabric.



Figure 4c. La trame lancée: interwoven into a ground fabric and shown on the reverse side.

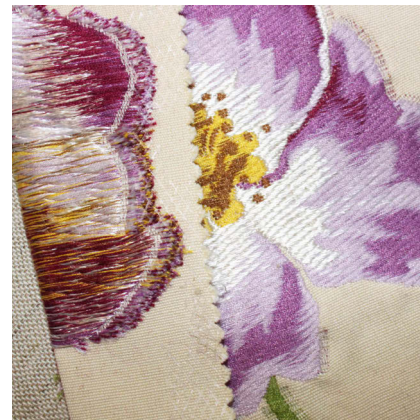


Figure 4d. La trame lancée: clipped float

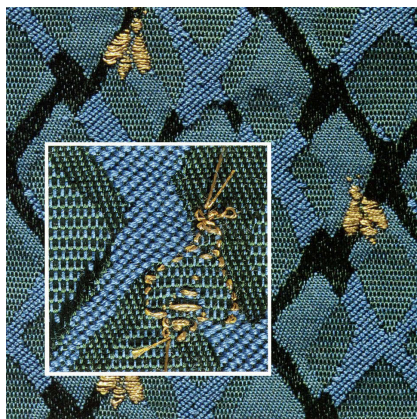


Figure 4e. La trame brochée occurs only on motifs and is recognisable by the details on the reverse side.

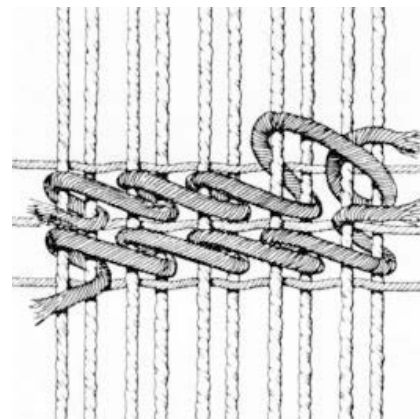


Figure 4f. La trame crochetée may create stitches and loops on a ground fabric.

continuous or discontinuous brocade. In both examples, the weft threads may be continuous or discontinuous along the textile's height but they differ in how the additional weft interlaces along the width of the fabric. In discontinuous brocades, the brocading weft (*la trame brochée*) occurs on patterned areas only. In continuous brocades, the supplementary weft (*la trame lancée*) travels from selvage to selvage, patterning the figures on limited areas and floating between the motifs (Holyoke 2013, 131). The weft floats are loose on the reverse side and some brocades have the weft threads cut away (Oakes 2014). This allows lightness and smoothness and adds cascading of the fabric. Nevertheless, the continuous brocade with weft floats cut from the back may be called either a *fil coupé* or a *de coupé* fabric.

Fil Coupé, De Coupé or Clip Design

The aesthetic of the fabric is often the most recognizable feature when defining a *fil coupé* (fig. 5.). Yet the most constituent attribute is the function of the ground weft and the supplementary weft. *Fil coupé* is a certain kind of jacquard, which is interwoven by using weft floats. These floats are usually cut to create a fringed look or to get a lighter essence of fabric. *Fil coupé* is commonly also called *de coupé* or *clip(ped)* design.

When defining a *fil coupé*, the essential factor is that the fabric has a floating supplementary weft (*la trame lancée*) and these floats are cut out or cut in parts. The Textile Glossary (2015) defines *fil coupé* as "an extra, floating weft which is embodied in a fabric, particularly a jacquard, and can be cut to produce a fringe effect". According to Jenny Fabrics (2015), in *fil coupé* fabrics interwoven threads are cut again in parts leaving wonderful effects and patternings on the cloth. Thus, clipping the floats creates an unique appearance and adds to the lightness or the transparency of the cloth. In the words of Joel & Son Fabrics (2015), *fil coupé* is usually a light weight silk fabric in which the threads connecting each motif are cut and create the frayed effect on the cloth. Materials of today's *fil coupé* fabrics vary greatly. However, the fabrics are often light and transparent with incidental decorations. According to these definitions, the essence of *fil coupé* fabrics is in the fringed and frayed look or in the beautifully decorated patterns on light weight fabric.

The more informal terms clip design, clipped design or clipped cloth describe the finishing of these fabrics. The nomenclature of *fil coupé* comes from the French words 'fil' and 'coupe' meaning 'thread' and 'cutting'. In Italy, these fabrics are called 'cimato', and the word 'cimatore' means clipper. In Switzerland and Germany, these fabrics are called 'Scherli', which comes from the word

Varieties of supplementary weft according to the function of it:

La trame liserée works both as a ground and a supplementary weft.

La trame lancée works only as a supplementary weft continuously from selvage to selvage, not as a ground weft. *La trame lancée* can float on the reverse side. Its float can be cut or it can be interwoven into the ground fabric as an extra.

La trame brochée, a true brocading weft, works only discontinuously as a supplementary weft. It occurs only on the motifs or cluster of motifs and does not travel from selvage to selvage.

La trame crochetée is similar to a true brocading weft. In addition, it can also travel back and forth between the picks in the motif constructing loops and stitches on the fabric.

'Schere' meaning scissors. The cutting of the weft thread is such a crucial feature of the fil coupé fabric, that it occurs in the different designations of these fabrics. On the contrary to the brocade, the float of fil coupé may occur on the face of the fabric instead of on the reverse side and by cutting the floats in parts to the pills the fringe effect is created on the surface.

The Purpose of the Finishings

In textile manufacturing, clipping is one of several finishing treatments of woven fabrics. According to ACT: Association for contract textiles (2015), finishings (or finishes) are "any processes or treatments applied to a material to alter or change the look, feel or performance". The purpose of the finishing treatment on textiles is to add specific functional properties in addition to improve their aesthetic value (Bajaj 2001, 631). There are several finishing treatments of textiles which can be categorized in various ways. Seema Sekhri (2011) analysis the classification of finishes as following:

1. On the basis of the life of finishes: temporary, durable and permanent
2. On the basis of mode of action: mechanical and chemical

Mechanical treatments are usually done by machine. In chemical treatments the end result is based on the chemical reaction. (Sekhri 2011, 205-207.) According to Sekhri, finishing methods can also be classified according to the following:

1. Basic and routine finishes
2. Functional finishes that alter appearance
3. Functional finishes that alter performance
4. Nanotechnology in finishing industry
5. Interrelatedness of finishes (Sekhri 2011, 207-224.)

Clipping is a finishing treatment for woven fabrics, in which the floats of the supplementary weft is cut from the ground fabric. Clipping can add aesthetic value and create a unique appearance in the fabric.

Clipping

The clipping is based on a mechanical finishing method and a functional finish that alter the appearance of the fabric. The industrial treatment is done purposely with a machine to cut out the floating weft picks from the fabric and finish the treatment by brushing the surface. Clipping is also regarded as a functional finish that alter the performance because long floats on the fabric are often impractical while using the final product. The expected results of the finished clipped fabric support Bajaj's (2001) essential conviction of the purpose of finishing treatments: it adds specific functional properties, such as practicality by cutting the long floats. It also improves the aesthetic value by creating a figured design or fringe surface with a special and particular appearance. How clipping is applied in industrial finishing can vary, depending on the facility for the clipping. Hand cutting allows any kind of ways of cutting. Cutting by machine on the other hand sets distinct requirements for the cloth and provides different outcomes of finishing. These factors will be discussed further in the section *Requirements and phases of production*.

Other Finishings for Woven Fabrics

Along with clipping, the textile industry has developed distinct finishing treatments for woven textiles. Due to the textile industry's long history, many of the present mechanical finishing treatments are based on traditional methods.

Ironing is a finishing treatment that is used to add smoothness and lustre of the cloth and the finishing process differs depending on the quality and the material of fabric. Beetling is an ironing process for linen and cotton, pressing is for woollen and worsted fabrics and calendaring is a industrial version of domestic ironing which can be used for very special finishings e.g. producing a so called moiré effect on the cloth. Finishing treatments can also produce various embossed and structured effects i.e. either flat or raised patternings which are achieved by embossing calendaring, slashing or cutting. (Shutton & Sheehan 1989, 138-140.)



Figure 5. Fil coupé fabric, Lodetex collection

Fulling creates felting on wool and raising creates a furry effect on cloth by brushing the surface. Cropping is used for velour fabrics (Shutton and Sheehan 1989, 145-153).

In addition to these mechanical finishings, the textile industry uses various chemical treatments for achieving functional properties such as fire resistance, soil and stain repellency or antibacterial qualities. Presently, nanotechnology and wearable technology provide even more advanced properties for textile finishing. Some chemical treatments can be done to the fibre before the actual manufacturing of the cloth, but can be done also afterwards. Various printing methods and dyeing are ways of finishings that alter the appearance of the cloth.

Some finishing treatments and manufacturing techniques may result in a similar look of the cloth as clipping would on woven fabric. Embroidered textiles and burn-out qualities can often be mixed up with clipped fabrics. In embroidery, the patterning and decorative motifs are usually added afterwards and not simultaneously with manufacturing the ground. In a burn-out treatment, open and transparent parts of the cloth have been

expressly burned out during a chemical treatment. The professional eye must thus demerge the quality of the fabric from the little details and the structure of the cloth.

As discussed in the literature, brocades and fil coupé fabrics are detailed decorated textiles that are constructed by weaving with different weaves for the ground weaves and the pattern weaves. Thus, the crucial similarity is in the functionality of the weft series. Consequently, this study designates, that in true brocades, threads are woven into the cloth usually on limited areas, whereas in a de coupé or a fil coupé floating threads occur between the motifs and are cut. Therefore the clipping is the essence of clipped cloths in industrial manufacturing. It adds value by providing the unique look of the cloth. Presumably, 'fil coupé' is an industrial term of particular fabrics. While revising the history of these fabrics, it is impossible to present definite considerations about the initial position of industrial production. Consequently, it is more relevant to define these fabrics as fabrics using weft floats and take bearings to the history of brocading and figured silk weaving.



Figure 6. Fragment of brocaded silk woven from a silk design by Anna-Maria Garthwaite from 1745.

Development of Brocading and Figured Weaving

Weaving is one of the most common techniques in textile manufacturing. It has a long history and there are various techniques and methods applied to weaving both in the industry and as a creative work of art. Brocading is one of the techniques that has been used all over the world. However, it is not possible to define exactly when and where the brocading was initiated. Examples of brocaded cloths have been found in many different periods and countries and the process of brocading has been similar everywhere. According to Andrew Reath, we can only suppose that as long as fabrics have been woven by using simple, plain structure of cloth, equally as long have people brocaded them by weaving (Andrews Reath 1927, 52). Hence, it is necessary to return to the origin of the Silk Road when revising the history of brocading.

The Silk Road and Figured Silk Weaving in Europe

The trade between East and West was initiated through the Silk Road. Brocades and other silk fabrics appeared in Europe along the Silk Road, through the Far East and Persia, originally coming from China. According to Wilson, the earliest woven silk fragments are found from the period 2860 BC–2650 BC. These early silk fragments are woven using simple plain weave structure and presumably patterned cloths followed soon after, thus sophisticated silk fabrics were produced from early time. (Wilson in Harris 2010, 133.) China exported silk fabrics and these fabrics have been found along the trade route from China to Southern Siberia and to the West. Silk trade had been so important to China that they greatly tried to protect their sericulture treasure (silk farming and silk production) from others. Consequently, silk cocoons were originally brought to Europe by smuggling. This kind of clandestine trade enabled the cocoons to land into Europe and for sericulture to become a western industry.

Along with the trade between the East and the West, silk weaving begun in Italy and Spain. Sic-

ily, alike Spain, became the silk weaving centers of Europe. In the course of the 13th and the 14th centuries, the Italian republic established domestic silk production and Italian weavers migrated to Lucca, Florence, Genoa and Venice. During the Italian Renaissance, figured textiles were considered works of art (Holyoke ix, 2013). Italian weavers developed both textile art and technical methods in weaving. In velvet manufacturing, technical innovations allowed new types of designs, such as uncut piles of gold thread and variety in height of velvet piles. In velvets, the piles are created by a special velvet weaving technique, in which the warp thread forms the pile after cutting. Gold and silver brocading was often used as decorations in the velvet structure. By asymmetry and movement, Italians brought a free and wild style to the designs. We may see examples of this in the work of artists such as Crivelli and Pisano. This sort of participation in developments contributed to the prominent position in velvet manufacturing. With a high standard of craftsmanship, successive technical innovations and products of superb quality, Italians succeeded to remain in the leading position in the silk weaving industry for almost four hundred years. (Geijer 1979, 141-153. Sutton 1982, 147-148.)

During these centuries, France imported velvets and other silk fabrics from Italy and Spain. When domestic silk production started in France, skilled Italian craftsmen were invited to Lyon to teach technical methods to the French weavers. French weavers developed more lighter, elegant and less durable products. Along Claude Dandon's invention of the new draw loom, the center of weaving slowly changed from Italy to France during the 17th century.

French silk production concentrated on fashionable products and new costume materials for people in the high society and the French monarch – to "the fountain head of all changes of taste and fashion" (Geijer 1979, 154). Moreover, this kind of action contributed to the fact that this was where fashion was born. The great Colbert, Louis XIV's finance minister, reorganised the whole

structure of French industry and his programme of 1667 agreed that manufacturers were to produce new patterns every year. In order to respond to growing demands and stimulate the French silk industry, manufacturers produced new patterns twice a year until the end of the century. Designers in France were well-paid and enjoyed an acknowledged social status. However, becoming a skilled pattern designer inevitably required a long and expensive training. Furthermore, designers had to assume a fundamental knowledge of weaving, abilities in bold imagination and the ability to assess the changes in fashion and the client's demands. Eventually, demands of the trade provoked even more innovations and culminated in the revolutionary invention of the Jacquard loom. (Geijer 1979, 153-155. Sutton 1982, 148.)

Other European countries have used their own domestic materials for weaving, thus, silk weaving all over Europe was long dependent on Italy and France. In England, silk weaving was initiated by Flemish refugees in Spitafields at the end of the 16th century. Silk weaving slowly spread also to other countries in Europe and due to the French Revolution, the Austrian silk industry and export increased prominently. In Spitafields, damask and soft brocaded silk were the main manufactured product and the work led to domestic industry. At the end of the 18th century, England was said to have obtained the leading position in silk and velvet production. (Geijer 1979, 163-164. Sutton 1982, 148.)

At the turn of the 18th and the 19th centuries, the industrial revolution highly influenced textile manufacturing. More affordable synthetic and natural fibers, such as polyester, cotton and viscose, were already available and the production was more effective. At the beginning of the 19th century, the invention of the Jacquard machine (fig. 9a.) revolutionized the weaving industry. Joseph Marie Jacquard, a French weaver and merchant from Lyon, presented his invention in 1804. The principle of this transformational invention of Jacquard was that the loom was based on punch cards. This made it possible to construct figured patterns on fabric by selecting and lifting warp ends automatically instead of raising each of them by hand (Torvinen 2006, 1). Throughout the history of weaving, the transmission of the data i.e. the warps position relative to the weft, has required

a complex and time-consuming process. The Jacquard machine ensured the repeatability of a design and enabled figured cloths to go from rare to reproducible goods. (Holyoke 2013, ix.)

Precious Materials and the Use of Brocading

Originally, brocading threads such as gold, silver, copper and silk were precious materials. Holyoke emphasizes the economical point of view, the two main purposes of brocading was to save precious materials and to avoid adding extra weight to the fabric (Holyoke 2013, 108). Lightness influenced the weight of the fabric and naturally lighter fabrics were easier to transport. Additionally lightness added to the cascading of the cloth and made it more comfortable to wear. Gilt brocading was often used for small decorated details of sumptuous clothing and for furnishing fabrics. For instance, brocades were often used for drapery and upholstery (ACT: Association for contract textiles) and they occurred especially in church textiles and chasubles (fig. 7a.), men's waistcoats (fig. 7e.) and women's skirt flounces (fig. 7g.) as well as on wedding robes.

During the history of textiles, people have modified and revised old fabrics to add value to frayed cloths. In order to learn more, I met up with Tuulia Lampinen, who is researching historical textiles at Aalto University. We discussed precious materials and their use in brocading. She (2015) pointed out that faded cloths could also have inspired the weavers to use floats and long pills as an accent on textiles, instead of them being considered as a fault. These worn fabrics (together with velvet pills and brocaded loops) may have had an impact to provide a fringed and a furry effect on the surface of the fabric. The price of the silk fabrics are high therefore revising the fabric lengthens the life cycle of expensive goods.

Since the process of brocading has been so similar everywhere, the material of the cloth is significant in delineating the period of time (fig. 7a-h.). According to Andrew Reath, the material of the brocading thread imparts the date of the woven fabric (Andrew Reath, 1927, 53). For instance, linen core and metallic materials like gold beaters' skin and copper alloyed with silver are only used

Brocading in Early Silk Fabrics and Renaissance and Rococo Silks

Gold was a common material in early European silk fabrics. Nancy Andrew Reath assumes, that brocading threads in early silk fabrics may have been pure gold. These fabrics have unfortunately been destroyed in order to reuse the precious metal in the classical and early medieval periods. However, Reath questions whether brocaded fabrics with pure gold were even woven in plentiful quantities, and supposes rather that gold threads were used in embroidery. (Andrew Reath 1927, 53.)

During the 11th century, a new metallic thread called gold-beaters' skin appeared in Europe. This thin leather membrane refined from animal's gut was gilded on one side and wound in narrow strips around a core of linen or silk thread. Gold-beaters' skin is a particularity of European weavers. In Italian fabrics the core is usually linen, while in Spanish fabrics a silk core is more common. During the 13th century this new metallic material became popular in weaving, while pure gold and silver still occurred in embroidery. (Andrew Reath 1927, 53.)

During the Renaissance in Europe, coloured silk became more common in brocading and gradually silver or silver gilt took over gold-beaters' skin. For instance, many Italian fabrics from the 14th and 15th centuries have silk brocading and in addition, an extra weft of gilt thread occurring from selvage to selvage. (In other fabrics, brocaded silk and gilt threads rarely appeared in the same fabric.) At first, the metal strips were wound on a linen core, but after the 15th century, the core was invariably silk. If the silver is gilt, the silk core is yellow (fig. 7c.) and if it is not gilt, the core is white. (Andrew Reath 1927, 53.) The essence of Italian Renaissance fabrics is in the combination of silk and silver.

At the end of the Renaissance period, a new metal thread that consisted of plain silver strips woven flat without a core, was introduced in Europe and were highly popular in textiles from the 17th and the 18th century. The plain silver threads occurred almost invariably as the pattern weft from selvage to selvage, instead of true brocading wefts. At this time, silver strips still appeared with the silk core, however, the strips were twisted in a new way so that more silk showed. (Andrew Reath 1927, 53-54.)

Around the beginning of the 18th century, brocaded threads with different varieties occurred in almost every elaborately decorated silk fabric made by European workmanship. In these beautifully patterned Rococo fabrics every kind of material can be found and combined; colored silk, chenille, spangles, and several varieties of gilt and silver threads. In Europe, especially in France, combinations of fine and heavy silk threads twisted together as well as chenille brocading became popular. During the same time as chenille appeared in France, silk and metal brocading with extra selvage-to-selvage wefts began making its way into the fabrics. (Andrew Reath 1927, 53-54.) The production process of chenille (fig. 8b.) considerably resembles brocading with weft travelling from selvage to selvage.



7a



7b



7c



7d



7e



7g



7f



7h

RANDALL

Figure 7a–h. (previous spread)
a. French silk chasuble, 1707–1708. Design by James Leman;
b. 17th century brocaded satin, CJH;
c. Traces of gilding on metal strips wrapped around a yellow silk core. Detail of threads from “Abraham Entertaining the Angels”;
d. Detailed decorated velvet brocade costume. Bronzino’s painting “Portrait of Eleanor of Toledo with her son Giovanni de’ Medici” (1544-45);
e. Samples from a pattern book by Maze and Steer and waistcoat woven by Maze and Steer in 1789. The waistcoat can be identified from the pattern book;
f. A short boot by Salvador Ferragamo 1955–1956. The fabric is a elastic brocade of silk and lurex. Selvage produces a frill around the top of the shoe;
g. A skirt flounce, sample from a pattern book by Harvey, Ham and Perigal, 1792;
h. A clipped silk scarf by American weaver Randall Darwall with presentation box and leaflet.

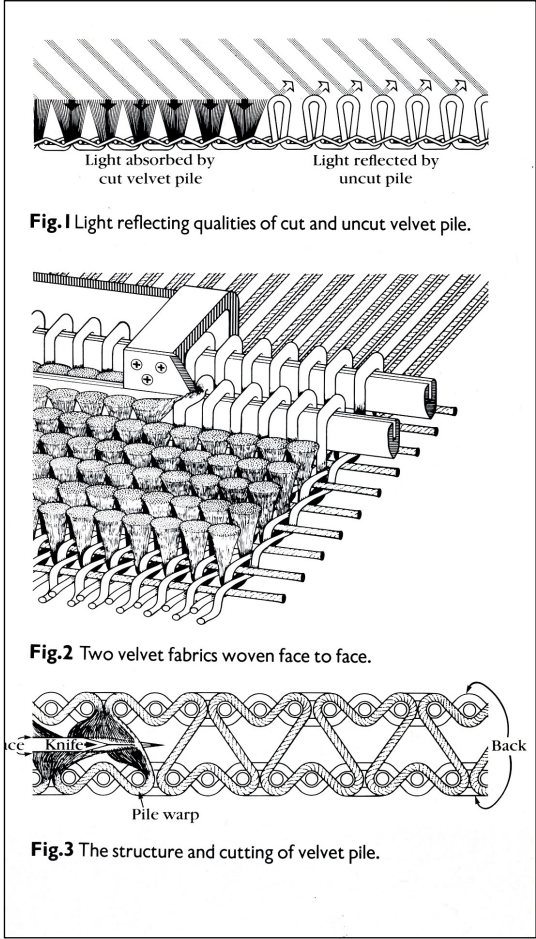


Figure 8a. Cutting of velvet pile

Figure 9a. (facing page) The old jacquard machine

Figure 9b. (facing page) The new jacquard machine (at Lodetex)

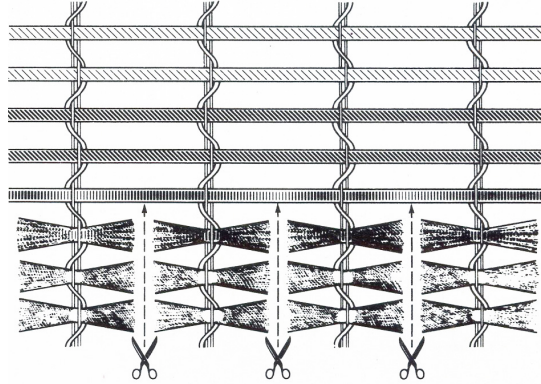


Figure 8b. Chenille manufacture

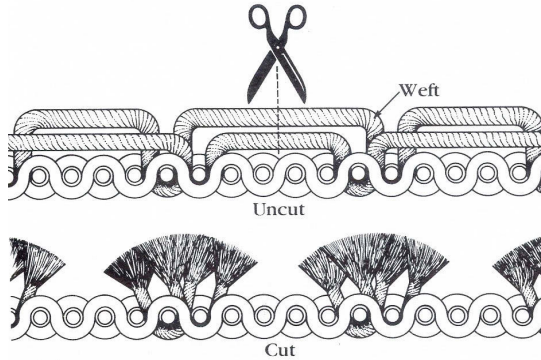
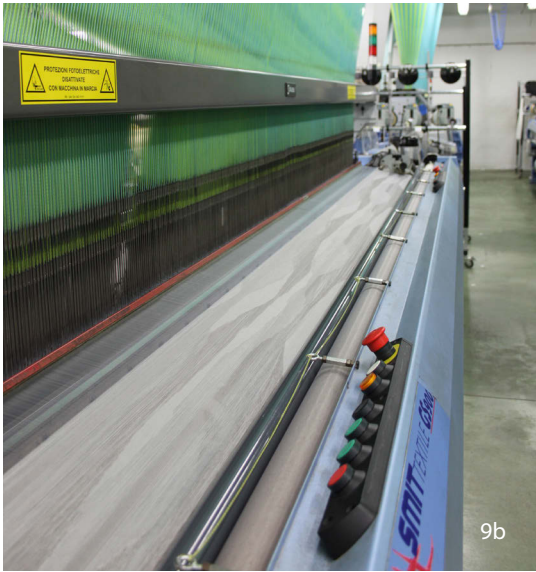
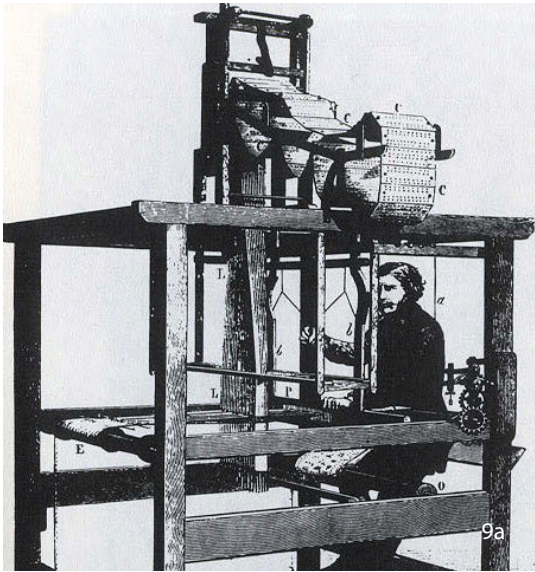


Figure 8c. Corduroy manufacturing



in European textiles and does not occur in textiles from Persia or Asia Minor (Andrew Reath, 1927, 54-55). By taking the use of material in consideration, textile historians may define where and when the fabric is woven. In the 18th century, the designers often signed their designs, therefore the date, manufacturer (fig. 7e.) and designer (fig. 6.) of these fabrics can be defined precisely.

Industrial Manufacturing and Digital Jacquard Design

The use of supplementary weft traveling from selva to selva (la trame lancée) has displaced the true brocading weft (la trame brochée) in industrial production. Tuulia Lampinen (2015) clarifies, that in St. Gallen in Switzerland, around the turn of the 17th and the 18th century, real brocading was used in industrial manufacturing of woven textiles with an equipment called tonneau. The tonneau is a special spork used for brocading. Lampinen assumes, that similar weaving may still be in use in industrial production, and recalls, that she has seen true brocading in clothing fabrics a few years ago. However, today, finishing by clipping is usually needed and used for fabrics with weft floats.

Presumably, the development and increase of

the industrial textile manufacturing was due to the fact where conserving production time became a priority before reserving the material consumption. Today the production of fil coupé fabrics is based on digital jacquard weaving. When weaving fabric, there are certain ways of applying weave functions to create the structures of figured fabrics. The designers of woven textiles use CAD-programs to create the particular weave function for the loom. A designer needs therefore to have an understanding of weave glossary in order to choose, build and evaluate weaves.

Although the center of weaving has changed from one place to another and the industry has developed, the technique of brocading has not changed very much. The interwoven structure of the cloth is still grounded in the basic function of the ground and the supplementary weft. Most changes have taken place in material consumption and the reduced use of real brocading weft. Modern industrial production of textiles does not require the same time-consuming process and sparing material consumption as in the past. The abundance in material variety has led to a more affordable yarn price. Machines have enabled faster weaving (fig. 9b.) and finishing processes and CAD-programs has provided useful tools for designers and technicians.



Figure 10. Lodetex stand in Heimtextil 2015

Present Markets, Businesses and Manufacturers

A textile travels a long way and takes several turns before it becomes a final product for the consumer. The production chain includes multiple phases. These phases are presented in this section from weaving mills to the finishing and further to the textile editor companies.

Fil Coupé Products

Today, fil coupé fabrics pertain primarily in medium and high-end products and occur prominently both in clothing and furnishing markets. The textile companies that have involved fil coupé products into their collections, are almost invariably medium and high-end brands operating in the markets. (fig. 11a–s.)

In fashion and clothing markets, fil coupé products occur most ambitiously in women's collections and muted in small quantities in men's collections. Recently, light and transparent as well as rich and fringed fil coupé designs captivate on the catwalks, red carpets and ready-to-wear collections of couture brands. In women's fashion, fil coupé fabrics manifest distinctly in detailed, decorated dresses but these fabrics occur also in shirts, skirts, trousers and jackets. Traditional and ornamental styles occur in vogue and decorative patterns. Floral and geometrical motifs are common. However, a more minimalistic style coexists alongside the abundance and culminates in more abstract and structural surfaces. In men's fashion, the style is always more simple. Men's shirts often consists of restrained patterns and surfaces with minimalistic elements.

In furnishing markets, the fil coupé products are very often transparent and lightweight i.e.

sheers and curtains. The patterns are traditional and classical e.g. florals or geometrical motifs with colorful layers. Furry surfaces occur less in furnishing compared to fashion. The companies who provide fil coupé fabrics often operate in medium and high level contract textile markets. Clipping technique is rarely used in upholstery fabrics, because of the high quality standards, for instance abrasion resistance in contract textiles. In thicker and stiffer furnishing and upholstery fabrics, supplementary weft is more often interwoven to the ground fabric between the motifs, because lighter and transparent essence is not needed.

Weaving Mills

Most of the weaving mills in Europe are specialized in the production of one particular kind of woven fabric, e.g. upholstery or curtains in contract textile markets, home decoration textiles, innovative materials and solutions or fashion and clothing textiles. For instance, Swedish companies Svensson and Almedals operate in contract textile markets and the Austrian weaving mill Backhausen is specialized in upholstery fabrics. Furthermore, there are many weaving mills in Europe, such as Prosetex, Para, Mario Sirtori and Limonta in Italy; Baumann Decor in Austria; O.J. Van Male, Weverij Van Neder and Termolst in Belgium; Thistle Mills in Great Britain; Raymakers in Nederland and Gassa in Spain, that are all specialized in a particular use or style of the fabrics.

In addition to woven textile manufacturing, weaving mills often provide design services to their customers i.e. the textile editor companies. Innovative designs and new solutions are created

Figure 11a–s. (next spread) Fil coupé products on present markets: a. Giambattista Valli; b. Sahco by Ulf Moritz; c. Vivienne Westwood; d. Giorgio Armani; e. Giambattista Valli; f. Jenny Fabrics; g. Michael Kors; h. Lanvin; i. Lela Rose; j. Oscar de la Renta; k. Louis Vuitton; l. Burberry; m. Thakoon; n. Alexander McQueen; o. Donna Karan New York; p. Erdem; q. Sahco by Ulf Moritz; r. Stella McCartney; s. Salvatore Ferragamo



11a



11c



11d



11g



11j



11k



11n



11q



11b



11e



11h



11l



11o



11r



11f



11i



11m



11p



11s

in the in-house design studios of the weaving mills and presented to the customers in e.g. textile fairs or during appointments around the world. Weaving mills may also provide some basic and routine finishes along the production of weaving. However, special finishing treatments are often executed in factories that are specialized in finishing treatments.

Finishing Companies

Like weaving mills, most of the finishing companies are specialized in a particular finishing treatment. These companies often operate in very concise areas and thus they can provide special expertise and professional ability in particular niche markets. Consequently, finishing companies rarely have their own weaving manufacturing. Rather, they produce finishing treatments for textile man-

Lodetex

Italian weaving mill Lodetex has over 50 years of experience in the textile market and is specialized in producing curtains and fabrics for internal furnishing and contract textile markets. Lodetex is directed towards medium and high level markets mostly in Europe but also in Asia, Australia and the USA. Lodetex operates on B-to-B markets and sells designs and fabrics mainly to Italian and European editors, i.e. Kvadrat, Kinnasand, Sahco, Zimmer & Rohde, Fishbacher, Création Baumann and Rubelli / Armani Casa. Lodetex develops designs according to its customer's needs and requirements. The company provides full service including designing, sampling, design development and production. Alongside the client cases, Lodetex develops its own collection. They offer a variety of designs to their clients. The company presents their new collections and innovations regularly at several textile fairs in Europe and Asia, for instance at the Heimtextil fair in Frankfurt (fig. 10.) and at Proposte in Como and Shanghai.

Lodetex's mission is to focus on flexibility, innovation and custom-made products. The company invests in technology, product development and in the professionalism of the employees. Lodetex wants to provide innovative and experimental techniques, materials and fabrics to their clients. Lodetex is well-known for their light and transparent curtains and their production focus is on flame retardant fabrics. They have various production lines for other internal furnishings. Presently, the company is experimenting in fashion markets with a mission to increase the production of a new line for fashion. In addition, the collaboration with fashion brands have inspired designers at Lodetex's design studio to adapt and try new styles and experimental ideas on to furnishing fabrics.

Recently, Lodetex's experiments and developments have focused on three-dimensional structures, digital printed jacquard fabrics, pure linen and Coex collections and also a mix of various materials. The company has also started a new piece dyed service. Alongside the experiments with woven fabrics, the company has mapped out possibilities in material production such as dyeing and manufacturing of yarn qualities. Presently, the company develops ideas and explores new technical possibilities such as the use of special yarns and finishings of fabrics.



Figure 12. Lodetex weaving mill



Figure 13. Vibe Cimatura

Vibe Cimatura / Vibe Research

Vibe Cimatura is an Italian company that began making finishings for stitched fabrics in 1989. In 2001, the company initiated clipping for jacquard fabrics. Today, Vibe produces finishings for fashion and furnishing companies. They handle around 7000 meters of fabric per day. This is a lot when regarding the very special methods and techniques they use. During the last two years, Vibe has doubled their sales in the fashion market and their trade in the Asian markets have increased noticeably. However, sales to furnishing companies have decreased. Alongside other clipping companies in Italy, Vibe is specialized in experimental clipping finishings and therefore many fashion houses such as Alexander McQueen, Chanel, Armani, Versace, Gucci, Escada, Max Mara and many others produce their textile finishings at Vibe. Vibe has clients that are willing to apply the company's experiments and who also accept that samples may not succeed perfectly at the first attempt and that multiple attempts are necessary. Often in fashion more experimental designs, techniques and materials approves in artistic and innovative collections.

At the moment Vibe invests in new machinery and development of finishings. During this year (2015), Vibe launched a new name and concept, Vibe Research – The Innovation Company. Their mission is to invent new processes and techniques and provide highly innovative finishing services to international textile markets. Their first milestone has been to develop a new cutting method for fur and velvet surfaces. The technology and method of this new process has been patented and it is totally green. As of this year, Vibe began offering consulting services regarding fabric constructions. Vibe is developing other innovative processes and their next goal is to develop finishing treatment placed on clothing.

ufacturers such as weaving mills. For instance, one of the most versatile and capable fabric printers, the English company Standfast & Barracks, produces beautiful prints for many furnishing brands on the market. Finishing companies often have a long tradition in specific treatments, and thus their expertise serves beneficially to the weaving mills that are more specialized in design development and production of textiles. This kind of business collaboration has influenced the constitution of textile industry clusters in Europe. The finishing companies and weaving mills are often located in the same district close to each others.

Textile Editor Companies

Interior textile brands are commonly called textile editors. These companies provide the final product produced by manufactures into the markets. The suppliers concentrate on the collection, colour and material coordinating in order to deliver new trends and trading products to consumers. These companies may operate either in B-to-B or B-to-C markets, or in both. Some textile editors have specialized in a particular concept, product or market. The Finnish textile editor Lauritzon targets the contract textile markets and provides high-quality fabrics for furnishing. Many of Loretex's clients are textile editors i.e. Sahco, Ulf Moritz, Lelievre, Mokum and Nya Nordiska. These companies have included clipped fabrics into their collections among other textile products.

Fashion and Trends in the Present Textile Industry

Fashion was born mainly due to the reorganisation of the French industry during the late 17th century. In the spring of 2015, trend forecaster Li Edelkoort, published her manifesto Anti_Fashion, in which she proclaimed ten reasons why fashion is obsolete as we know fashion this far. Edelkoort criticizes that when people today discuss fashion, they discuss clothes, products, accessories and brands and ignore the origin of fashion. Edelkoort says e.g. the following "the great names of the past were able to change society by introducing new silhouettes, new postures and new forms of

movement". She argues that the biggest threat to the textile industry are the cutback of costs in the education system and in the fashion houses, because the first to be sacrificed are knitting and weaving ateliers. Edelkoort continues to warn that due to this emerge, students are no longer educated in textile creation or gaining basic knowledge about fabrics. According to her, this will lead to the situation where the European textile industry will lose their ability to create cloths because the knowledge of spinning, weaving, finishing and printing will be lost. However, Edelkoort predicts, that the textile industry's future will be in couture and team work and this will become an alternative to cheap clothes. (Edelkoort 2015. Dezeem)

I understand Edelkoort's fears and believe that the European textile industry has a genuine need for textile gurus. I believe that a multidisciplinary collaboration and the specific professional knowledge in various fields will be – or is already – the future of textiles. This trend can already be perceived also within the students of Aalto University, who have been awarded internationally and appreciated for their technical skills and creative innovations in the field of fashion and textiles.

Although, Edelkoort's overall message about the present position of fashion in the European textile industry is a frightening one, her message affected me and gave me an encouraging and promising sign for the future. The goal of my study is to explore new ideas, study the industrial textile creation and examine the technical requirements of weaving and finishing.

The production and supply chains require collaboration and participation from several specialists in various fields. Today, many brands offer products where clipped fabrics have been used. These cloths appear in sterling products such as dresses, skirts and curtains. In the spring of 2015, fil coupé seemed to represent a rising trend as a continuum for the furry and fringed look of textiles. Various products occur on the market in great quantities today, yet the variety of products does not differ a lot from the past. Yet, these decorative textiles represent luxurious and sophisticated styles in dressing and dwelling. Couture is an evolving trend, but simultaneously the lack of designers technical knowledge may become a real threat for innovations in the industry.

Summary I

This first chapter provided the theoretical background to the world of floating and clipping. The chapter focused on searching for the answer to the first research question:

1. *What is the present position of fil coupé fabrics in fashion and furnishing markets and what kind of paths are found from the past to the present considering the development of brocade-ing?*

The center of weaving has changed from one place to another and the industry has developed. The technique of brocading on the other hand has not changed a lot. The only changes have taken place in material consumption and the reduced use of real brocading weft. The present industrial production of textiles does not require the same time-consuming processes and sparing material consumptions as in the past. The invention of the jacquard loom and digital jacquard design applications as well as other technical solutions have remarkably influenced the manufacturing of woven fabrics. The clipping is the essence of clipped cloths and it adds value by providing a unique look to the cloth. At the moment fil coupé seems to represent a rising trend, yet the variety in products does not differ a lot from the past. The fil coupé represent a luxurious and sophisticated style in dressing and dwelling.

I assume that the changes in the industry has influenced the distinct designations of brocades. In Italy, velvet manufacturing, highly decorated fabrics and technical development of weaving have been so prominent in the past, that it still affects the general use of the term brocade today. It can describe any kind of detailed decorated, gold or silver patterned or embossed woven fabric, because of the characteristic appearance and richness of Italian velvets. Apparently, textile historians can define a brocade fundamentally by looking for the use of true brocading weft and with a precise connotation. Instead in France, a similar weaving technique was developed to produce more lighter, elegant and fashionable cloths.

Presumably, replacing the true brocading weft by supplementary weft traveling from selvage to selvage and clipping the floats proved to be a more efficient method in the increasing industry. Thus, still today, the light and transparent essence of fil coupé represent profoundly a fashionable French style and look, whereas brocade has become to describe any rich style.

Due to these developments, designers need technical understanding and artistic expression skills as well as – eventually – the ability to perceive evolving trends and respond to the markets’ demands. In the world of digitalization and technical revolutions, designers need to manage all three aspects. The paths of past may guide today’s designers to the new road of development and to find unforeseen solutions. Yet, at this point, it is time to let go of the past and take a step into the future world of floating and clipping.



Figure 14. Idea portfolio sketches

Chapter II

DESIGN CASE : *floating & clipping*

This design case researches the creative utilization of various ideas and their functionality in the industrial production of clipped cloths. The goal of the design case is to study textiles using weft floats and evolve ideas that come from the technique. The idea portfolio and fabric designs are created for multiple purpose use of woven fabrics.

The first section presents the design concept. It reviews the practice-led research method in my study, presents the themes and colours that have inspired me and describes the collaboration with Lodetex.

The second section describes the design process and presents the idea portfolio for this study. It reviews the process from various ideas to the design development and to the choices of material and structure. This section explores the requirement and the phases of production and the industrial design process.

This second chapter searches for the answers to the second and the third research question:

2. *What are the phases of production and what are the requirements in weaving and finishing of clipped fabrics?*
3. *How can new ideas be evolved from the technique and how can they be adapted into the industrial production?*

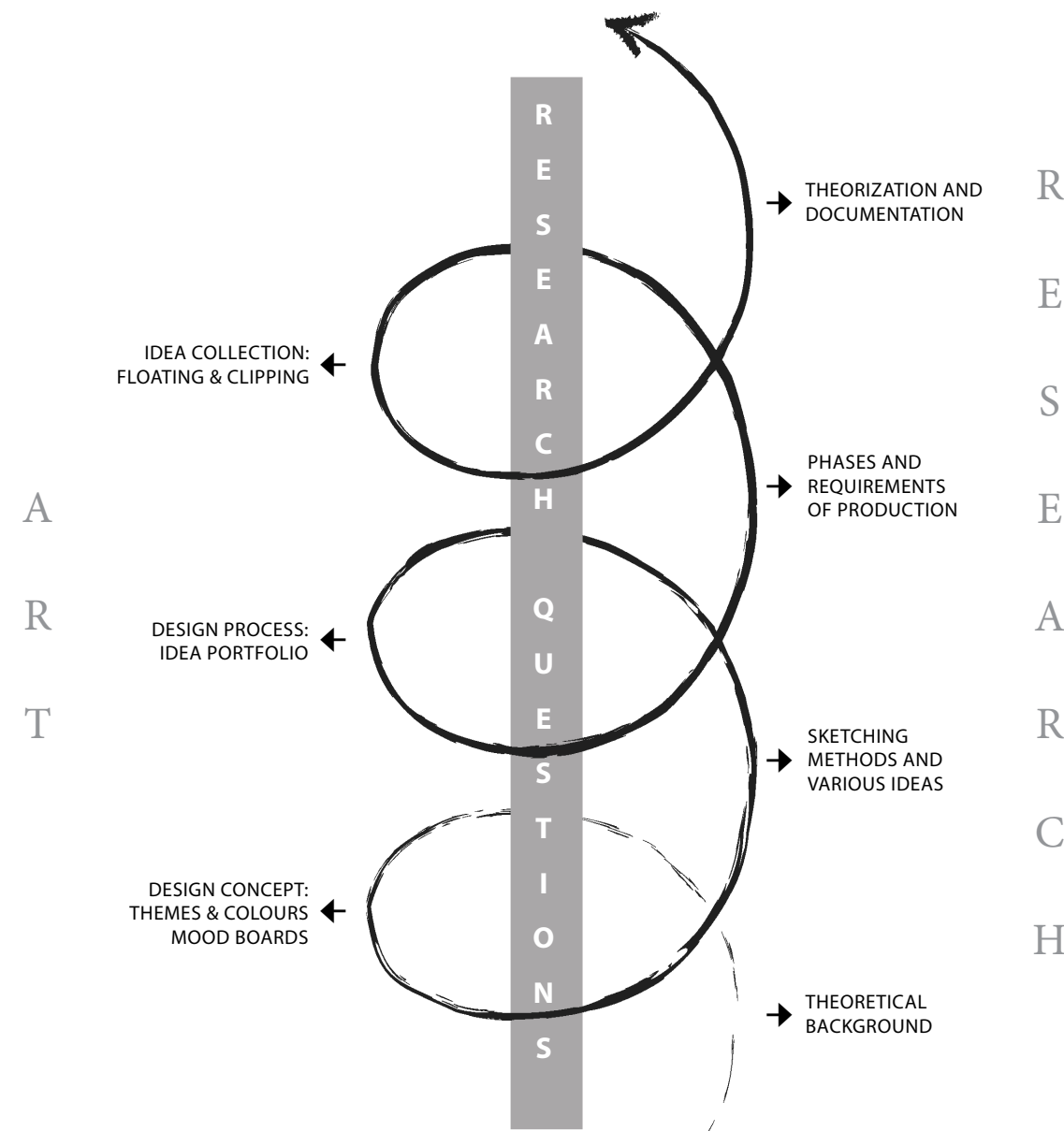


Figure 15. Design process described by practice-led research dialogue.

Design Concept: Ideas that comes from Technique

The design concept of this study intertwines with the technique of floating and clipping. There are various techniques and methods that can be applied to weaving, both in the industry and as a creative work of art. All weave structures are based on a very simple precept. Sharon Alderman (2004, 1.) frames it simply: "either the weft passes over the warp or it passes under it". The wide variety of woven fabrics are constructed by following this basic principle of weaving. Therefore, all eventual ideas are limitless and the constructions can be modified endlessly. In this design case, my basic principle of weaving is created into a wider scale: either the weft floats over or under the warp, or it interlaces with it.

“

*either the weft floats
over or under the warp,
or it interlaces with it.*

“

Practice-led Research

Practice-led research is a form of research that has been used increasingly in studies of art and design. The definitions of the term practice-led vary depending on the author and the application of the method. The basic principle is that creative practice functions as an instrument for the researcher and the creation of the work provides new insights that the researcher can generate into new knowledge. Creative practice includes the artwork and the surrounding theorization and documentation (Smith & Dean 2009, 5).

In the foreword of the recent Art of Research V conference catalogue, Maarit Mäkelä (2014, 1.) discusses practice-led research as following: "The research that takes place in the intersection where knowledge, material thinking and experience fostered through creative work meet." Mäkelä has

studied and applied practice-led research. Among other inquiries, she has edited 'The Art of Research I (2006) & II (2012)' publication with Sara Routarinne and Tim O'Riley. She also holds the conference chair in the programme committee at the Art of Research conference.

In my practice-led research, I created an idea portfolio through creative work. The main purpose of the idea portfolio is to demonstrate the structure, texture and appearance of the final fabric. In other words I wanted to concretise my knowledge, material thinking and experience. The idea portfolio represents the prototypes of the woven fabrics. It helps me as a designer in the conversation with the technicians. Hence the idea portfolio works as a guideline for creating a digital design and a technical file for a loom as well as the production. Furthermore, for me as a designer, it works as a tool or an instrument when studying the requirements and the phases of production. (fig. 15.)

Themes and Colours

In the beginning of my design process, I created three themes. My experiences from both Italy and Finland inspired me while creating the themes. In July 2014 I returned to Finland with new experiences and influences after a three month long internship in Italy. First and foremost, I felt happy and grateful. I had met a lot of new people and visited wonderful places from pulsating cities and towns to beautiful seashores and astonishing mountain landscapes. These fascinating adventures escalated in extremely inspiring activities: walking around the cities, visiting the museums and art galleries, attending Milano Design Week and trekking and climbing in the refreshing warm weather of the Alps. The changing environment from the cities to nature fascinated me and inspired me in the future design process. I was immensely excited when engaging myself into new experiences with floating and clipping.

The themes grew subconsciously and intuitively.

tively and developed slowly step by step. In September 2014, I started collecting visual material that supported and materialized my thoughts. In the beginning of the process, I made a conscious decision, that I will not finish any mood boards or themes before initiating the actual design process. I wanted to work with unfinished mood boards and maintain a freedom to develop them during the process. By doing so, I was able to work flexibly and make changes e.g. edit the colour palette regarding Lodetex's needs. The three themes; After Rain, Mineral Mosaic and Botanical Garden (fig. 16a–c.), work as an inspiration for the patterns and colourways in the design process of the idea portfolio.

Collaboration with Lodetex

Lodetex has various customers and several production lines. At the moment the company is developing their fil coupé collections for both fashion and furnishing. By creating an idea portfolio, my purpose was to evolve various ideas and develop them at the Lodetex weaving mill. In November, I travelled back to Italy to study at Lodetex, develop my ideas, to learn about the production and to adapt the designs into production. During two months, I had a great opportunity to work with wonderful and fascinating people, to learn practical knowledge from them and to experience my own development as a designer.

Lodetex has a staff of 35 people (Lodetex 2015). During two months, many of them helped me, shared their professional knowledge and influenced the final outcome of this study. My design development focused on working in the design studio where I worked closely with a design coordinator named Marie van Landeghem and a weaving technician named Fabrizio Brignoli. They both shared their knowledge of weaving with me and they were a great support to me. Marie was more orientated in evaluating the material qualities, the visuality, the innovation and the aesthetic of my designs, whereas Fabrizio guided me in the constructions of the fabric and in designing them with the weaving program EAT. Alberto Colombo, who is in charge of the linen collection, shared his thoughts about my designs for linen and commented on my ideas.

Lodetex also organized an appointment for me with Vibe. I had the opportunity to visit Vibe's clipping factory and learn how clipping works in practice from Alessandro Beccati, the founder and the general manager of the company. After the appointment, I stayed in contact with Vibe by email and discussed Vibe Research and their new developments with the company's organization with development manager Paolo Rovri.

The concept of my practice-led research is to evolve ideas that come from the weaving technique, where the weft floats over or under the warp, or it interlaces with it. Themes and colours evolved from my experiences in Italy and they worked as a starting point and an inspiration for the design process. In the collaboration with Lodetex, I had the opportunity to emerge the knowledge, material thinking and experience through creative work.



Figure 16a. After Rain mood board; organic and harmonic surfaces, light and dark shades of blue and violet with a sophisticated shine of silver and copper.

The Inspiration: After Rain

The weather and its changes influenced me to create the first theme. In the summer of 2014, there were a lot of the differences between Italy and Finland. In June in Helsinki, the weather was an epitome of Finnish summer, cold and rainy. At the same time in Italy, I enjoyed heat and coincidental refreshing showers of rain. In July, I headed back home and the pouring rain intensified in Northern Italy. Simultaneously, a heat wave radiated in Finland after a rainy June. Yet I avoided the actual storm and pouring rain. All the new experiences had been falling on me, nourishing my spirit and reforming my mind like a storm instead. After the metaphorical figurative of pouring rain, I desired a moment of rest and calm and also space and time for the dawning insights and my new explorations. The rain and these emotions generate in the first theme: After Rain – representing a break, returning and revival.



Figure 16b. Mineral Mosaic; geometrical shapes, shades of turquoise and burgundy with metallic tones of black and gold.

The Inspiration: Mineral Mosaic

The second theme arose from my fascination of the mosaic art. The beautifully decorated patterns, the geometric ornaments and the variety in the colours of the stones inspired me. Italy has a long tradition in elaborate manufacturing of mosaics. Many Italian historical and cultural heritages are full of decorative mosaic art: the famous mosaic manufacturer Ravenna, the ancient cities of Pompeii and Herculaneum as well as the Baths of Caracalla in Rome. Traditionally, people gathered to the baths for socializing. The baths full of mosaic art represented art galleries. After bathing a fresh and clean towel is essential. This fact builds a cosy bridge back to textiles. Also the essence of textiles have been inspiring for mosaic artists. These two disciplines have a lot in common e.g. the way of working with the material, the colours and the haptics handle. Mosaic art with a touch of minerals capture the second theme: Mineral Mosaic – representing an abundance and a purifying rite.



Figure 16c. Botanical Garden; floral patterns, bright yellow, green, violet and red tones with earthy tones and transparent white.

The Inspiration: Botanical Garden

The third theme sprang from the bloom of nature and human beings various ways of capturing and retaining its beauty of blossom. The idea of storing and collecting led me to explore botanical gardens and books, scientific drawings, flower compositions and photographic art illustrations. In general, flowers have multiple symbolic meanings such as birth, love and growth. One way of storing and collecting flowers is pressing. When pressing, the flower stays in its natural organic existence and in its material composition. However, it is reformed by a human into a new shape. The pressing is kind of a human-made finishing treatment for a product of nature and it alters the appearance and durability of the plant. The mental and physical touch of nature manifest the third theme: Botanical Garden – representing a perception and exploration.




Figure 17. The first sketches to After Rain

Design Process: Idea Portfolio

In September 2014 in Finland, my design process began by creating the themes, brainstorming the ideas and developing sketching methods. In November, the process continued in Italy at Lodetex by improving the idea portfolio, choosing the materials and structures and preparing the designs for production.

When I started creating the sketches of the clipped designs, I knew very little about these fabulous fabrics. One of the things were, that fil coupé fabrics are often light and transparent fabrics, with decorative floral or geometrical patterns. A second thing was that the finishings and the actual clipping increase the price of the production and therefore fil coupé fabrics settle into a higher price category. Thirdly, in Lodetex's designs the length of the clipped float always has to be at least 3 cm, because otherwise the floats require clipping by hand and thus the production costs rise too high. Fourthly, the fabric design needs a plain weave binding beside the part of floating picks along the width of design. I thought that this weaving technique was very restricted but it forced me to try and find solutions and opportunities in order to break these restrictions.

However, I had no idea how the clipping functions with the machine worked in practice. How could I benefit from this technique and create a unique look for my designs? Could the machine cut the float in half from the middle without cutting out any of the yarns? Or could it cut the float only from the other side of the pile and thus create a furry and tufted look with long pills? And what happens to all left-over yarns and clipped floats after clipping?

In order to get started and begin brainstorming new ideas, I set up one rule for myself and that was to forget everything I knew and throw out the rule of three centimeters. Apparently, the new rule of no rules was easier to set than to follow.

Sketching Methods and Various Ideas

Invariably, all successful design processes start by sketching an idea – or rather, certain various ideas. The transparency and the fringed and frayed look are essential features of clipped designs. I am fascinated about the origin and did not want to reinvent the fabrics' essential feature. Rather, I wanted to design the appearance and performance in a way, that was significant to me. Regarding this, I chose to use materials that could offer the quality of transparency, lightness and the furry look.

I started sketching with the different materials that I had collected on my work desk: various yarns and fabrics, papers and card boards, tape and plastic, paints and brushes, leather and flowers. I used cutting, gluing, sewing, ironing, painting and dyeing as the sketching methods. Some of the sketching methods and materials offered a nice outcome for an idea, but did not comport well with my themes. On the contrary, some of the sketches matched the themes easily, but did not generate very innovative and inspiring designs (fig. 17.). At some point, I thought that I had a great idea for a sketch for the fabric, but the choice of the sketching method and the use of materials did not produce an interesting design in the end. However, the creative process gave birth to new ideas for sketching and designing. Each new sketch offered new ideas to work on and improve the idea in a more interesting way. The sketching process moved on very slowly because of the handcraft and the ways of working. I felt that the way I worked was too slow and I would never manage to finish all my ideas into sketches.

After several trials, I decided to drop the use of different materials and to focus on the most expressive and efficient ideas of sketching: Rolling the yarns around cardboard, gluing them partly onto light fabric and cutting the unglued yarns. Also, tearing and creasing silk paper or combining it with other materials and cutting and layering tulle as well as pressing flowers. Silk paper and tulle create a light and transparent effect, yarns and slashed fabrics provide the fringed look and

pressed flowers combined with mixed materials bring the contrast to the use of material.

During the sketching process, I learned which ideas worked and which were not so interesting. Even the ideas that did not work well as a sketch, were something that I needed to create in the beginning of the process, partly for warming up and concretizing my material thinking and partly to understand which methods work for me. In order to move on with new ideas and structures, I headed to Lodetex to gain new influences for sketching and to learn the practice of production. On the 3rd of November, I arrived at Lodetex and started to develop the first fabric designs for production and I also continued working on the idea portfolio.

Learning from Professionals

During my two months at Lodetex, I continued to work with the fabric designs. Along side the creative work, I learned from the professionals everything I needed to know about industrial manufacture of clipped cloths, this included both the phase and the requirements for production.

I presented my unfinished idea portfolio to Marie van Landeghem and we discussed potential ideas for woven samples and their development and improvement. Marie thought that my idea portfolio with themes was a good way to communicate technical details and illustrate the appearance of the fabrics. She explained more about the possibilities of clipping. I knew the rule of 3 cm and understood the placement of plain weave. With the help of my sketches, Marie was able to explain more advanced ways of applying interwoven structure to the clipped cloth. "There are many tricks we can do", she expressed. She thought, that it was good for me learn what can be done, so that I can use my ideas and create designs. I experienced the placement of float on top or on the reverse side of the cloth and the function of the double supplementary weft. This helped me getting started with the material and structure choices and preparing the digital design file. I created the digital files in EAT, which is the pattern and binding designing CAD-program for woven fabrics.

I improved my own design in EAT and pre-

pared the technical file for the production. Fabric designing requires the ability of abstract thinking in order to create the interwoven structure in EAT and in order to choose the materials for the design. My idea portfolio provided visual and tangible information about my ideas and helped in the communication about the technical implementations. When designing the structure and bindings of the fabric, Fabrizio Brignoli offered his knowledge and helped me to get started with designing the interwoven structures. He thought the sketch was a good idea and very helpful: "I see and understand the idea right away and I start to think about how to get the same result on fabric", he clarified. With his help, I managed to use the right densities for the weaves, arrange the weft functions properly and choose good material combinations. When I was met with complicated matters about the structures, it was always better to ask Fabrizio, instead of struggling with the challenging issues by myself. He had the ability to offer functional solutions for the fabric design, even when it came to more complicated constructions. "It's simple, it's easy", as he often expressed and encouraged.

When I got my design development in progress, Marie organized an appointment with Vibe. This was an opportunity to learn profoundly how the floats would be clipped in the finishing. On the 25th of November we visited Vibe and met with Alessandro Beccati. He introduced the operation of the company and presented the facility and finishing factory. Because of my lack of skill in Italian, Marie set up herself in the role as translator and delivered information about various clipping methods to me in English. Alessandro took us on a tour around the factory, explained expressively about various machines and their function, told us about hand clipping and the precious work of clippers and showed a few fabrics that were awaiting clipping. "This fabric is for Chanel, it will be clipped by hand, because the material of the yarn is too thick and furry for clipping it with the machines", he explained. The clippers apply hand clipping to the most delicate cloths and it is also the most expensive clipping method – around 10 euros per meter. In addition to hand cutting and basic clipping, there are also other clipping methods. Consequently, the float length of 3 cm is not always required. Furthermore, I had wondered what happens to all left-over yarns. Alessandro

clarified that the floats that have been cut generate new energy while burning in the power production. I was happy to hear that the floats can create useful energy after creating a work of textile art. After the tour in the factory, I presented my idea portfolio and got advise regarding the technical details and the use of materials. Alessandro thought that my sketches were fantastic examples of work from a designer who understands the basic principles of the clipping treatment. He found the idea portfolio a great way to present fabulous ideas and to deliver them to the industrial production.

During the spring of 2015, I analyzed my learning process and Vibe developed new methods and processes. I remained in contact with Vibe and discussed by email with Paolo Rovri, who was hired to Vibe Research to develop their new operations and services. He provided me with the updated information about their new developments during the spring 2015.

During the design process, I improved my artistic expression in the sketches, learned about the requirements and phases of production and managed to adapt new ideas into industrial production. This would not have been possible without the help of so many people at Lodetex and Vibe and their entailing of knowledge and experience.

Requirements and Phases of Production

The production of clipped design is a process that starts from designing and weaving and continues to finishing by clipping. Essentially, only a designer's imagination sets the limits for designing. Particularly in the handcraft working process all eventual ideas are feasible. During the industrial production, distinct facility and clipping methods can be applied producing diverse end results on cloth. Thus, the capacity of the machines composes not only the requirements but also the opportunities for the phases of production.

Julie Holyoke (2013) ponders which came first, technique or design, and sets up a question for weavers: "Once the loom and warp have been defined and their potential considered, which step comes next: choice of artwork and pointpaper, or technique?" She points out, that artists often tend to work with image-based designs exploring what kind of structural opportunities certain technique provides for the texture of cloth. In the end, each of them, design and technique, will affect the other. (Holyoke 2013, 155.) In this research, technique comes after the loom and warp because the clipping method affected the technique of weaving. Last but not least, comes the artwork.

Therefore, the first necessary phase in the pro-

Lodetex's looms			
100% CS:			
Rita white:	Grisu Dtex 22/1	40 picks / cm	repeat size 2400 picks / 60 cm
	Grisu Dtex 22/1	40 picks / cm	repeat size 13120 picks / 328 cm
Rita black:	Grisu Dtex 22/1	40 picks / cm	repeat size 2400 picks / 60 cm
	Grisu Dtex 22/1	40 picks / cm	repeat size 13120 picks / 328 cm
Sara white:	Grisu Dtex 22/1	80 picks / cm	repeat size 4800 picks / 60 cm
Sara black:	Grisu Dtex 22/1	80 picks / cm	repeat size 4800 picks / 60 cm
100% LINEN:			
Iris I	Lino 1/26 bollito	18 picks / cm	repeat size 2400 picks / 133,33 cm
Viola I	Lino 1/39 bollito	24 picks / cm	repeat size 2400 picks / 100 cm



Figure 18a. Clip design



Figure 18b. Clip design

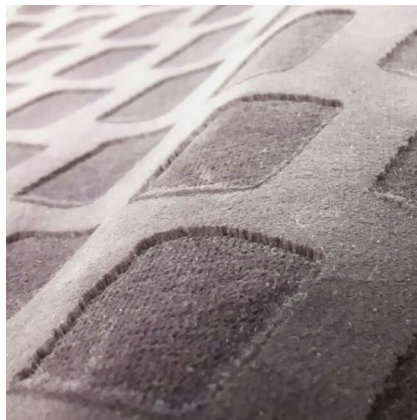


Figure 18c. Shearing green design

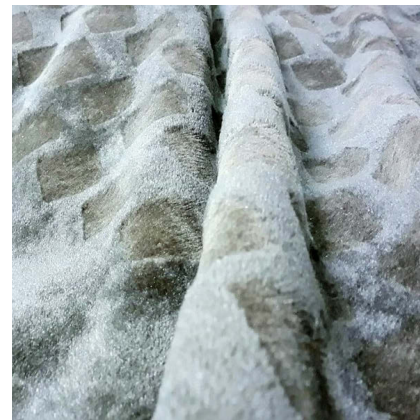


Figure 18d. Shearing green design



Figure 18e. Shearing green designs



Figure 18f. Cut design

Vibe's distinct clipping treatments and new finishing methods

Basic clipping

Requires a minimum of a 3 cm long float
Suitable for fabrics with a width of 330 cm

Spaccafilì

Requires a minimum of a 1 cm long float
Suitable for fabrics with a width of 330 cm or 180 cm

Rotating knife and air blower

The length of the cut float varies
Suitable for fabrics with a width of 180 cm

Hand clipping

Provides varieties and possibilities for clipping without any limitations. Requires a more delicate and time-consuming process.

Clipping of warp

Clipping of the warp yarns can be applied in many ways. Usually this method is used for very delicate fabrics and combined with clipping of the weft to gain a super light and transparent effect.

Shearing green design for fur and velvet

New cutting method for transferring pictures on fur and velvet surfaces.

Cut design

New cutting method for cut pictures on cloth.

Scratch design

New cutting method for scratched pictures on cloth.

Worn-out design

New cutting method for creating worn-out effects on cloth.

duction process is to choose the clipping method. The clipping method sets the requirements for the interwoven structure of the fabric with the floats i.e. the intervals of the weft picks. Lodetex utilizes only Vibe's facility for basic clipping, in which the limit for the float is always 3 cm. Consequently, the illustrations in this section follow the requirements according to the limit for the float of 3 cm.

Weaving at Lodetex

Lodetex has over 50 jacquard or dobby looms (Lodetex 2015.). At the Lodetex weaving mill, the fabric is always woven in the width of 330 cm and in the length of 160 cm. After weaving, the fabric is rotated 90 degrees in order for the height of the fabric to be 330 cm and the width to be 160 cm. By doing this, the weft picks occur vertically and warp ends occur horizontally in the final fabric. Rotating the fabric provides a more cascading essence of the cloth because the quality of the warp is often smoother comparing to the variety of weft yarns. This is desirable especially for curtains and clothing fabrics. In the final products, the fabric can be used as what is best for the particular product. In addition, during the finishing the fabric often shrinks and the final height is around 3 meters. This is a standard height of curtains in contract textile markets.

In the looms, the range of the qualities and the densities of the warp varies. In Lodetex's collections, the diversity of styles and materials varies greatly. The company has production lines of light polyester fabrics (including Trevira CS and other flame retardant qualities) and natural fibers (including cotton, wool and linen). Furthermore, Lodetex uses special yarn qualities that shrink, disappear or partly disappear when finishing with heat. Lodetex's new samples most often use warp qualities that are 100% Trevira CS and 100% linen. For my designs I used the looms of Trevira CS and linen warps.

At the finishing department, Lodetex has a facility for basic and routine finishings of woven fabrics. These finishing treatments consist mostly of distinct washing, steaming and ironing treatments. The purpose is to improve the quality of the final fabric. The company has also invested in a digital printer which is used for many different

fabric qualities. Depending on the quality of the cloth, some treatments may also work as functional finishings that alter the appearance or the performance of the cloth e.g. an effect that shrink the yarns or make the yarns disappear. The clipping is always done at Vibe.

Lodetex does not do regular sampling on the loom. The goal is rather to prepare the functional construction of the fabric into a digital format with EAT and to make practical choices of materials and structures. This provides a greater challenge to the designer. It requires skills in abstract thinking and the ability to visualize the final appearance of cloth. However, when weavers load the new design on to the loom, they always call the designer to attend at the weaving mill in order for the designer to approve or improve the quality of the design. Lodetex demands certain quality standards in their production. Therefore the ground fabric needs to be durable enough i.e. picks and ends need to be interwoven tightly together so that the yarns do not move too much.

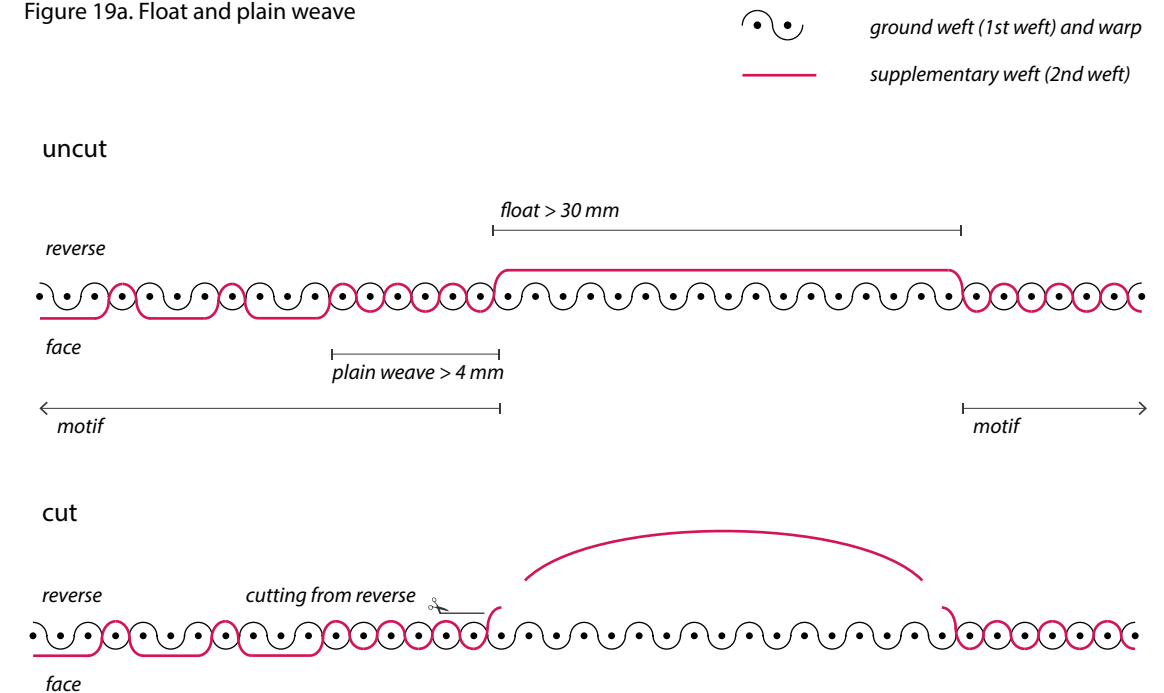
Lodetex production is directed to the furnishing markets and the focus is not only on developing experimental designs but also on the requirements of contract textiles. For this reason Lodetex always wants to provide a definite quality of clipping and has decided to use the basic clipping method at Vibe to avoid differences in the quality of the clipped fabrics. After weaving, the fabrics that need clipping are sent to Vibe. Other finishing treatments, such as washing, steaming or ironing, are always done after clipping and depends on the quality of the fabric.

Clipping at Vibe

Vibe has several distinct machines for clipping the floats. Each method provides different properties (fig. 18a–b.), e.g. a fabric rotates through the clipping machine at least two to three times before the clipping is completed and all the floating yarns are removed properly.

Little hooks in the machine lift up the floats from the ground and the round, rolling knives of the rotary cylinder on the opposite, cut the floats. Most of the machines are for cutting the weft yarns. In addition to these machines, Vibe has recently invested in a new warp clipping machine.

Figure 19a. Float and plain weave



Basic clipping is the most affordable method and sets the three centimeters limit for the float length (fig. 19a.). Basic clipping is used especially for finishing curtain fabrics, because it allows a fabric width of 330 cm. Clipping with this machine works best for cascading yarn qualities, such as polyester, viscose, silk and wool. The hooks manage to lift cascading floats easily from the ground fabric. On the other hand, thicker and stiffer yarn qualities are more challenging to cut without breaking the ground fabric. For this reason, this machine is often used for routine clipping.

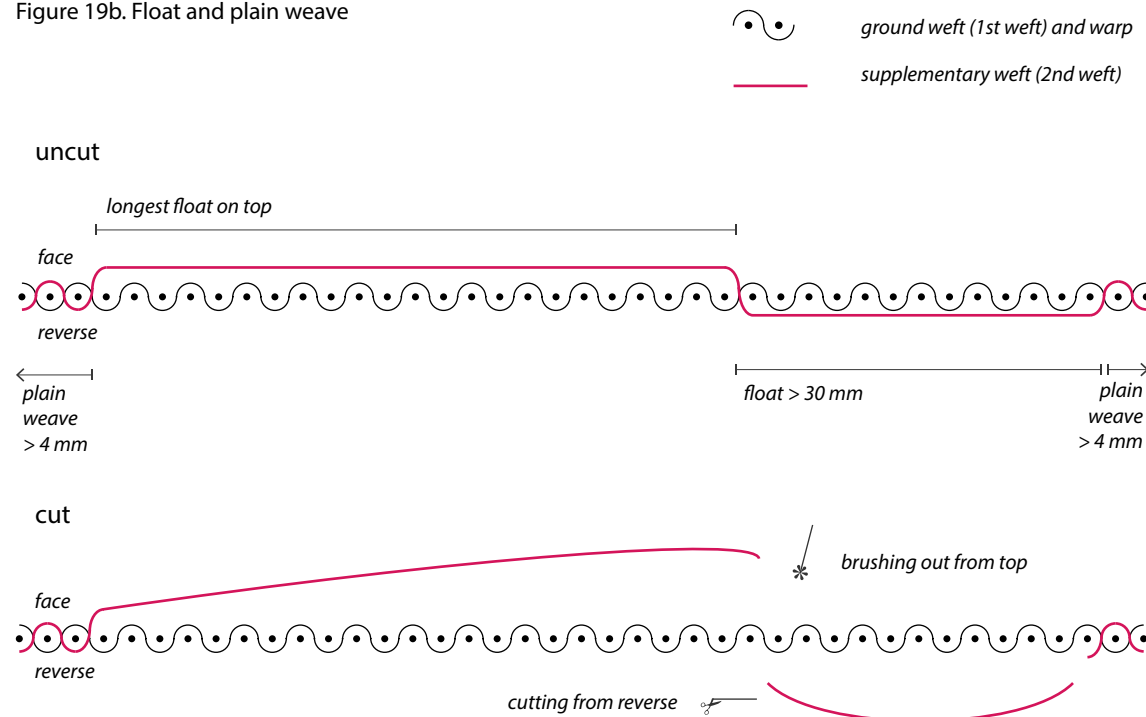
The company also owns a more advanced machine that can cut a one centimeter float. The Machine is called spaccafili and it is suitable for fabrics with a width of 180 cm or 330 cm. Spaccafili cuts off 99% of the floating yarns if the material is polyester or wool. For stiffer and thicker yarns it does not work very well, because the hooks can not lift the floats enough. Finishing with this machine increases the price of the clipping, but while weaving it allows to save yarn because there may not be a need for a double supplementary weft.

Clipping with a rotating knife and air blower is used for very special and particular fabrics that need delicate finishing due to little details or delicate material and structure. In practice, the air blow lifts the yarns from the ground fabric and the rolling knife cuts the lifted yarn. The length of the float, which can be cut, varies depending on the space between the fabric and the rolling knife.

Hand cutting provides clipping without any limitations. On the other hand, it is a more delicate and time-consuming process. Vibe actively develops alternative ways of clipping and use hand cutting only when it is necessary. Hand cutting allows clipping stiffer and thicker floats also on delicate and loose ground or clipping floats in half in the middle leaving a wonderful fringed effect on the fabric.

One of the company's newest investment is a machine that cuts the warp floats. Warp clipping is often combined with weft clipping. Usually the warp clipping method is used for very delicate fabrics and provides a super light and transparent effect and also detailed parts and motifs on the design.

Figure 19b. Float and plain weave



Vibe has recently developed a new cutting method for fur and velvet surfaces. The company is experimenting whether a new CAD-program, electronic devices and technical applications can be adapted to an old machine from 1972. This new method is called the shearing green design. (fig. 18c–e.) The technology and the method of this new ecological finishing process have been patented. The company is also developing new cutting (fig. 18f.) and scratching methods and techniques to produce worn-out effects. These new finishing treatments will come into production in September 2015 and are still protected by trade secrets. At the moment, Vibe is studying three other innovative finishing treatments for next year.

When clipping, the length of the float and the quality of the cloth always affect the use of a certain clipping treatment and the final appearance of the fabric. In practice, smooth floating weft yarn qualities such as polyester, wool and viscose, on dense and sustainable ground fabric can easily be clipped using basic clipping methods. Thicker or stiffer weft yarn qualities on delicate or loose ground fabric often require hand clipping treat-

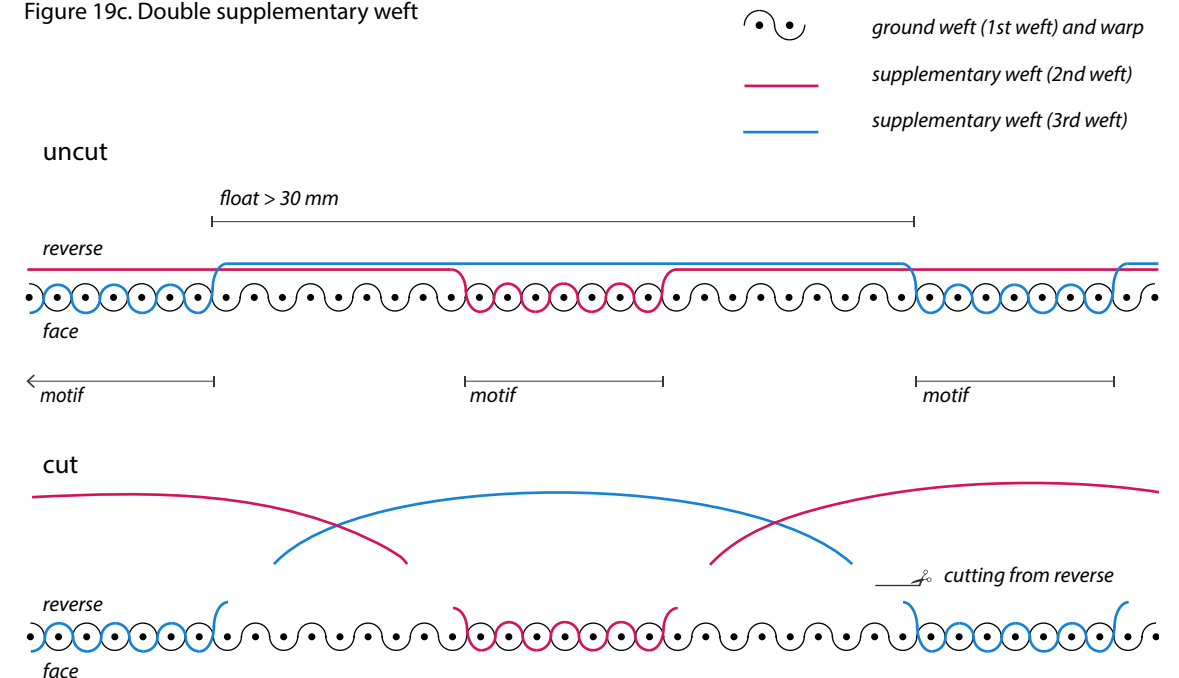
ment in order for the final fabric to be proper and decent.

Designing and Weaving

The following certain factors conducts the process of designing and weaving. The plain weave binding on the edges of the motifs ensure that the weft does not move after clipping. The float may occur on the top or on the reverse side of the fabric, depending on the design. By duplicating the supplementary weft, certain limits may be turned to new possibilities when designing and weaving.

When weaving any fabrics with weft floats, two is the minimum amount of weft systems required: the first is for the ground weft and the second for the supplementary weft. (fig. 19a–b.) In theory, the amount of weft systems can be increased endlessly. In practice, a smaller amount is often more economical because it decreases the complexity of the design and may conserve time when designing and also save material consumption. The number of the used weft systems proportionally effects the

Figure 19c. Double supplementary weft



price of the final fabric. The use of a very simple construction of weft systems does not effect the variety in colours or materials because the arrangement of the different weft yarns is possible to integrate for each weft system. The weft system can be used both continuously or discontinuously in height of the repeat, yet also simultaneously or partly concurrently.

The advanced application of supplementary weft is to duplicate it. (fig. 19c.) The use of double supplementary weft provides more latitude to designing and does not require the limit of three centimeters between the motifs. Using the double supplementary weft always increases the amount of weft systems to at least three – one for the ground weft and two for the supplementary wefts. It also increases the material consumption when weaving. Double supplementary weft can be used continuously or discontinuously in the height of repeat.

The placement of the float may occur on the top or on the reverse side of the fabric, or on both sides. (fig. 19a–c.) In practice, the longest floats need to occur on the top of the cloth when weav-

ing fabric on the loom. By doing this, the floats on top of the cloth roll inside of the beam and do not brake as easily during transport. For this reason, fabric is often woven face down and with the reverse side on top. However, if the uncut pills are longer in the front than the float that will be cut from the reverse side, the fabric is woven face up. The front of these kind of fringed designs are brushed after clipping to finalize the furry look.

The purpose of the plain weave next to the float (fig. 19a–c.) is to avoid unravelling of the yarns after clipping. Usually, the plain weave of 4 mm – 8 mm wide is enough to ensure the durability of the fabric. However, different yarn qualities have different impacts on the final result and quality of the cloth. For instance, a stiffer or slicker yarn quality often requires a wider part of plain weave, so that it stays durably attached to the ground fabric. Otherwise, all kind of weaves and their combinations are eventually inside the motifs. On a fringed surface it is advised to use only a plain weave in interwoven sections of the supplementary weft.

After choosing the loom, the weft yarn qualities and the bindings for the structure, I continued

Designing with EAT

Definition of picks and ends

The first phase is to define the densities and numbers of weft picks and warp ends as well as the scale of the design, since the program counts the right amount of pixels for the design. In this phase, it is important to make sure that the amount of picks in width and the ends in height are dividable by the total amount of picks and ends in the repeat.

Colour reduction and pattern repeat

In the second phase, the program provides different tools for pattern designing, for example tools for drawing, colour reduction or repeat (e.g. fig. 23a). Extra colours for the plain weave (e.g. fig. 39a or 41a) or for the supplementary weft (fig. 23a, 46a or 48a) can be added in this phase. The colours have to be defined according to EAT's colour palette.

Arrangement of the weft system

For finished and colour reduced repeats, the third phase is used to add the numbers of weft systems, to define color sequence areas for each one and to make the arrangement of the weft yarns in each weft system. Each weft cone has its own position on the loom and they are classified by numbers from 1 to 8. This means, that 8 is the maximum amount of weft cones that can be used when weaving the fabric. The arrangement of the weft yarns are defined by the numbers 1-8. If no weft pick is needed it is defined by the number 0 and an empty yarn by the number 10. Also, if the design and the multiple weft system requires stops while weaving, it is also defined in this phase by a regulator sequence.

Repeating the design for the loom

In the fourth phase, the design is repeated in width of the repeat size in the loom. For instance, on the Rita loom the width of the repeat size can be 2400 or 13120 picks.

Assigning the weaves to colours

In the fifth phase, the weaves will be added to the design by assigning bindings to the colours. The bindings are added for each colour of the design and for each weft system step by step.

Selvages

In the sixth phase, the selvages are added to the design.

Machine definition

In the seventh phase, the machine definition will be done by loading the right loom setting for the file, depending on the particular choice of the loom.

Scheda, info paper

After finishing the technical chain of the design, the technical file is ready for saving and for printing out an information paper. Scheda, an information paper of the design with the loom and the material instructions will be filled and printed out to the design archives.

designing in EAT. During several phases in EAT, a designer creates a technical file for the design. The technical file includes a technical chain, which is the construction information for the design. The loom follows the instructions from the technical file and produces the fabric regarding to these instructions.

Idea Portfolio Development for the Production

After learning the requirements and the phases of production, I realized all the wonderful possibilities that this weaving technique and finishing treatment could offer. I felt happy after my learning process, but at the same time I was also disappointed with the appearance of my idea portfolio at that moment. I had fixated too much on the limitations and disregarded the real freedom of creativity.

Moreover, I realized that producing all three themes, sketches and ideas into woven samples would require much more time than two months. Lodetex was also preparing new designs for the Heimtextil 2015 fair in January and our goal was to include some of my fabric designs in Lodetex's new fair collection. Marie told me, that they already had a lot of designs with flower patterns and colourful digital prints and therefore they needed more plain, semi-plain and structural designs to their woven collection. I therefore looked over my sketches and decided to eliminate one of the themes. Furthermore, I had seen an incredible little piece of three-dimensional cloth on Fabrizio's desk. I wanted to learn more about the fascinating structure of it and to develop that idea with Fabrizio's agreement.

In order to respond to Lodetex's needs as well as to understand and learn the distinct opportunities and possibilities of clipping technique, I decided to focus on improving and developing sketches from only two themes into woven samples. I chose the sketches After Rain (fig. 21.) and Mineral Mosaic (fig. 37.), because of the simpler repeats and structural patterns. The designs of Botanical Garden (fig. 20.) were more complex and time-consuming because of the detailed motifs, multicoloured surfaces and the diversity of the pattern design.

While selecting the sketches for production, I evaluated a new idea and its potential adaption into industrial production. Most of my ideas and sketches evolved from the mood board of After Rain. The first theme proved to correspond well with Lodetex's needs and inspired me with colours and structures. Eventually, I chose six sketches of After Rain and three sketches of Mineral Mosaic. These nine designs (with two digital print designs) made up my idea portfolio and with them I studied various structures and use of materials.

Materials and Structures

The material qualities and the structure of fabric affects the final price of the cloth. Lodetex has a great range of yarn qualities. Often, in clipped designs, the interwoven structure of the fabric requires a wider material consumption when weaving compared to the amount of yarns that will be left in the fabric after clipping. For this reason, I decided to use more affordable yarn qualities and thus avoiding high prices in the final fabrics. For the weft yarn, I often chose synthetic and natural fibers, such as polyester, Trevira CS, viscose, linen and cotton. More special and expensive materials, such as Lurex, I only used as an effect. In some designs, I mixed expensive qualities with more inexpensive ones. By doing this I managed to compensate the material costs.

From each design sketch, I created 1–3 variations of the design: each with a distinct material, structure or finishing treatment. I explored the material and the structure of the designs with nine distinct concepts in mind:

Fringed look
Floating without clipping
Print and clip
Layering
3d
Free floating
Shine and transparency
Clip and shrink
Fortuitous challenge

In each of my nine material and structure studies, I experienced new ways how to utilize a technique and benefit from it. Every design



Figure 20. Botanical Garden sketches

felt like a little experimental journey on which I gained new knowledge and new experiences on the way. In the first few designs, I studied basic tricks and their function in practice, such as the use of supplementary weft and various weave functions. Material constructions, cut or uncut float and printing provided distinct appearances on and properties of the cloth. Along with learning, I improved my ability in designing and started studying more advanced ways of technical applications in three-dimensional structures. These explorations evolved new ideas e.g. how to apply the uncut float inside the fabric. Gaining more understanding in advanced technical structures kind of pushed me back to study applying weaving in more traditional ways. I explored the shine and the transparency of the cloth and continued by adding shrinking qualities to the cloth. Eventually, I encouraged myself to take on more challenges and play extremely intuitively with the materials and structures.

The design process required an ability in abstract thinking because I was not able to try the various materials and structures while weaving on the loom. Therefore I tried to prepare the fabric design in EAT as well as I could. I found this to be the greatest challenge during the design process. On the other hand the sketches in the idea portfolio assisted me and helped me overcome the challenge. Some of the woven fabrics succeeded excellently regarding the original sketch. Some of the designs could still be improved. However, some of the designs were presented at Lodetex's stand in the Heimtextil fair in January 2015.

The following pages present the research of floating and clipping, that have been a vital source of this study and provided the answers for the research questions.



Figure 21. After Rain sketches



fringed look :

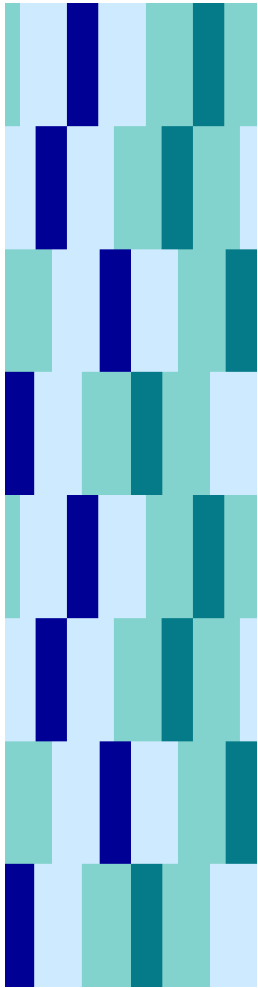
the variety in material

During my first research, I explored how to create a fringed look on the cloth. I had an idea for a fabric where the floats have been cut in half and that sparkles a little in the light due to its structure. In practice, the floats would not be cut in half, because that would require hand-clipping. Instead, I applied a double supplementary weft in this design and placed the floats on both sides of the cloth. The reverse side of the cloth was clipped and the face of the cloth was brushed out to create the furry appearance on the surface.

I made three different versions and examined the variety of each material and its impact on the look. I designed the first version so that the appearance was similar to the sketch (fig. 22.). In the other two versions, I played with the material choices but kept the structure of the cloth (fig. 23a. & 24a.) similar.

Figure 22. Fringed look: sketch and fabric

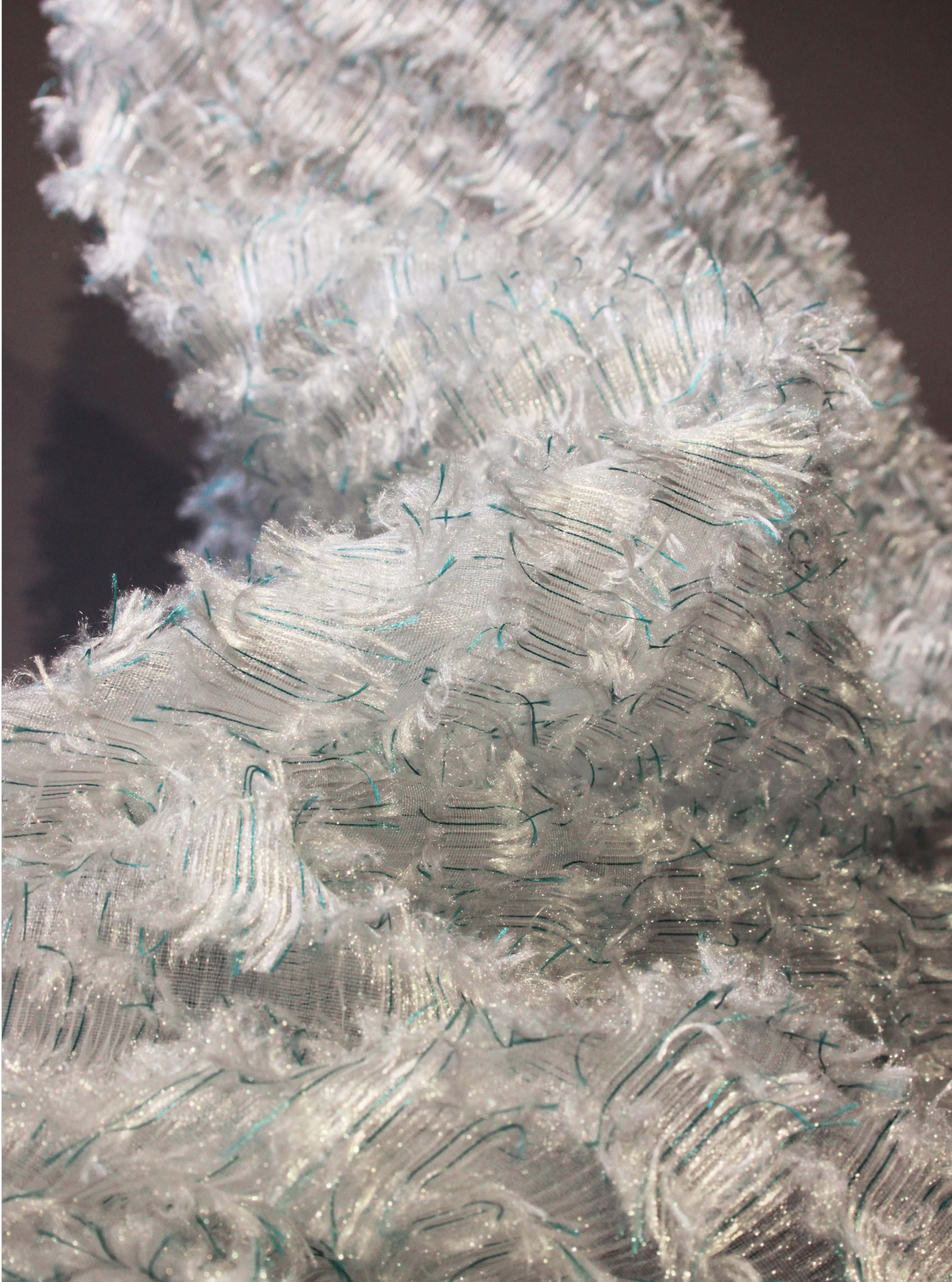
fringed look : ▯



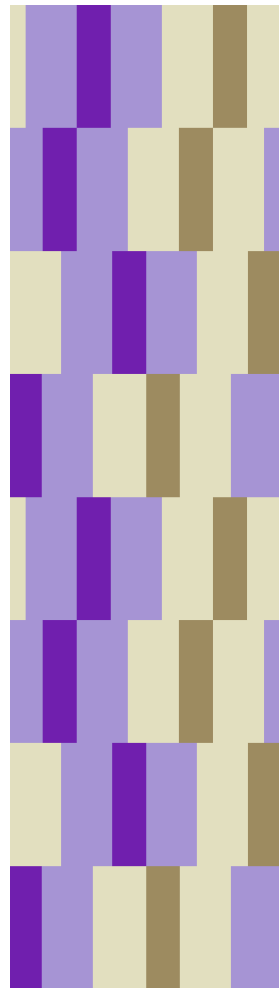
Disegno 22666

material: 100% PES
loom: Rita white
repeat: 6 cm x 23,5 cm

Figure 23a. Pattern repeat design in EAT
Figure 23b. (*facing page*) Fabric design 22666



fringed look : ☐☐



Disegno 22734

material: LINEN / VISCOSE
loom: Viola I
repeat: 10 cm x 36 cm

Figure 24a. Pattern repeat design in EAT

Figure 24b. (*facing page*) Fabric design 22734



fringed look : ■■■



Disegno 22735

material: LINEN / VISCOSE
loom: Viola I
repeat: 10 cm x 36 cm

Figure 25a. Pattern repeat design in EAT

Figure 25b. (*facing page*) Fabric design 22735





Figure 26. Floating without clipping: sketch and fabric

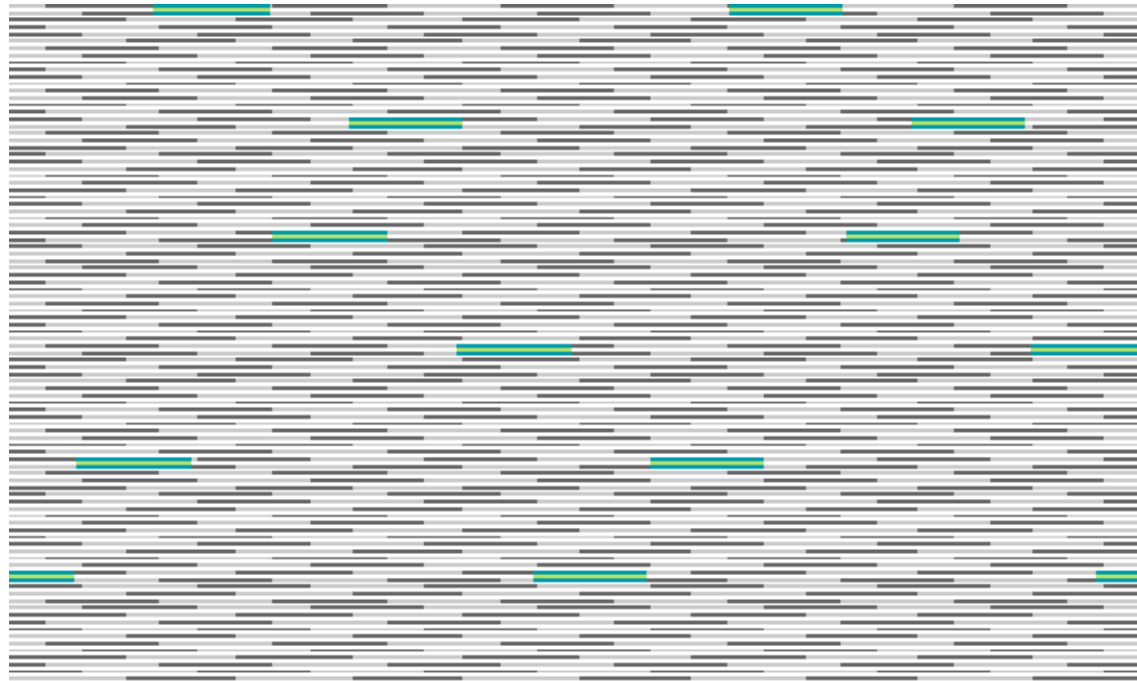
floating without clipping :

the uncut float

For my second research, I examined how the floating wefts act without clipping. In addition, I used a shrinking yarn quality in the ground fabric to highlight the uncut float. When the ground fabric shrinks during finishing, the float rises loosely of the ground. I chose to use a thick and light weft yarn and combine it with shiny lurex.

The sparkling surface profoundly provided the recreation of the brightness after a rainshower and works as an individual work of art. However, the final use of this design needed to be carefully considered, because the uncut floats could be impractical in the use of the final product. Eventually, I did not make new variations out of this design, because a impractical product is not desirable in Lodetex's collections.

floating without clipping : 𐀀



Disegno 22756

material: 100% PES
loom: Rita black
repeat: 5 cm x 6 cm

Figure 27a. Pattern repeat design in EAT

Figure 27b. (*facing page*) Fabric design 22756



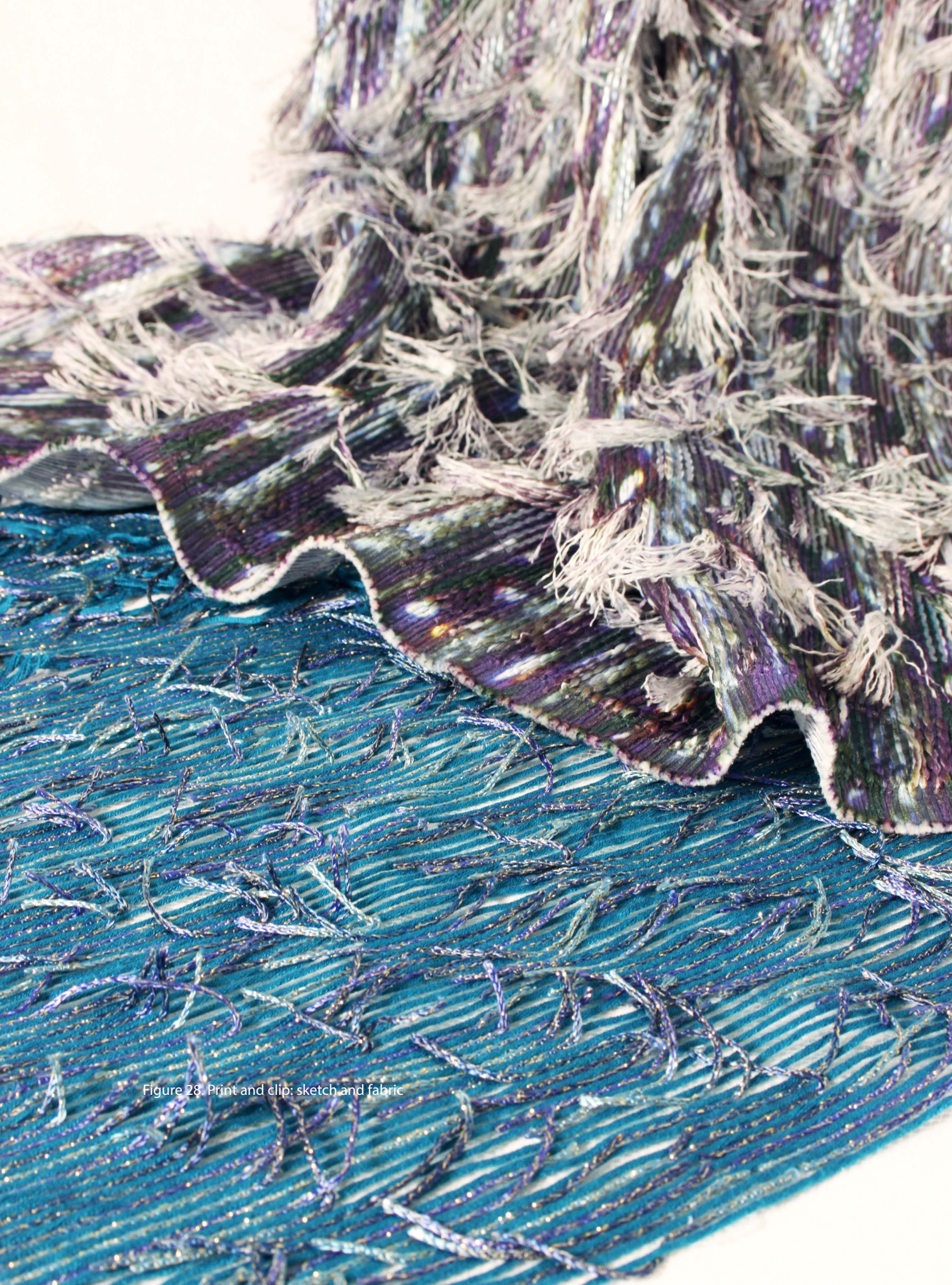


Figure 28. Print and clip: sketch and fabric

print and clip :

digital printing before clipping

During my third research, I explored how printing can be combined with clipping. The fabric is printed before clipping because otherwise clipped float piles can jam the digital printer. In this design, every other supplementary weft was clipped, and every other one was interwoven to the ground fabric. By doing this the print has a more observable surface on which to attach. I chose white weft materials for the weaving because print appears well on a white ground. I created the print (fig. 29c.) on the bases of a photograph of my sketch, which I had taken before cutting the floats. In my handmade sketch, I had cut the floats in half from the middle but in the final cloth I decided to clip them from the other side of the pile (fig. 28.). Therefore I placed the floats on both sides of the cloth. While clipping, the floats have been cut from the reverse side and brushed out from the face.

print and clip : □



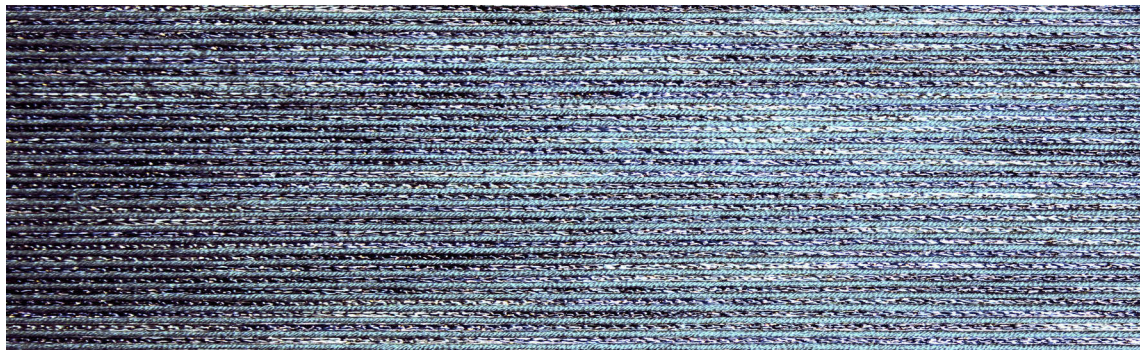
Disegno 22668

material: 100% PES
loom: Rita white
repeat: 10 cm x 4 cm

Figure 29a. Pattern repeat design in EAT
Figure 29b. (*facing page*) Fabric design 22668



print and clip : 00



**Disegno 22668
with print 40872 v1**

print repeat: 300 cm x 100 cm

Figure 29c. Digital print 40872 v1

Figure 29d. (facing page) Fabric design 22668 with print 40872



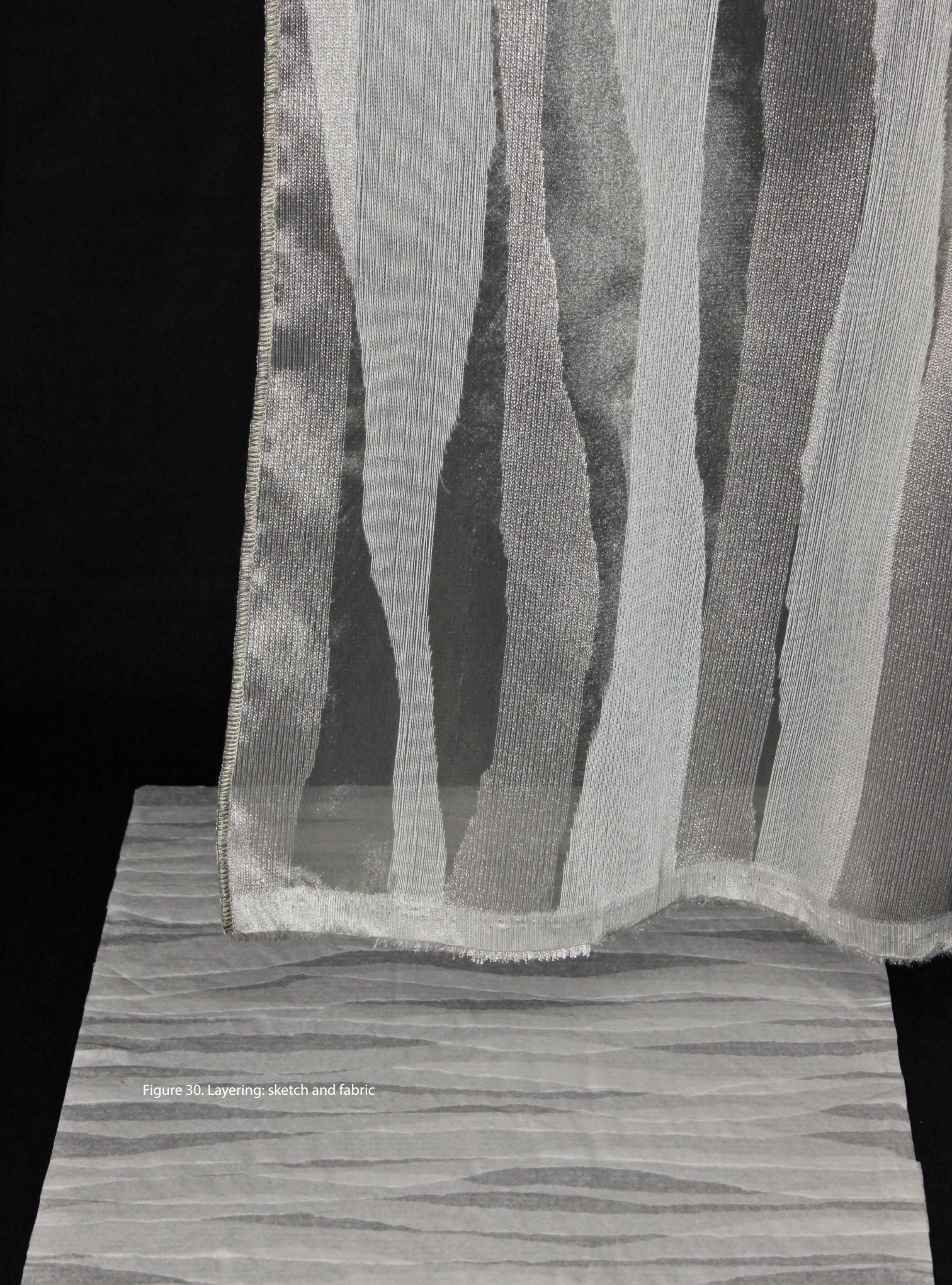


Figure 30. Layering: sketch and fabric

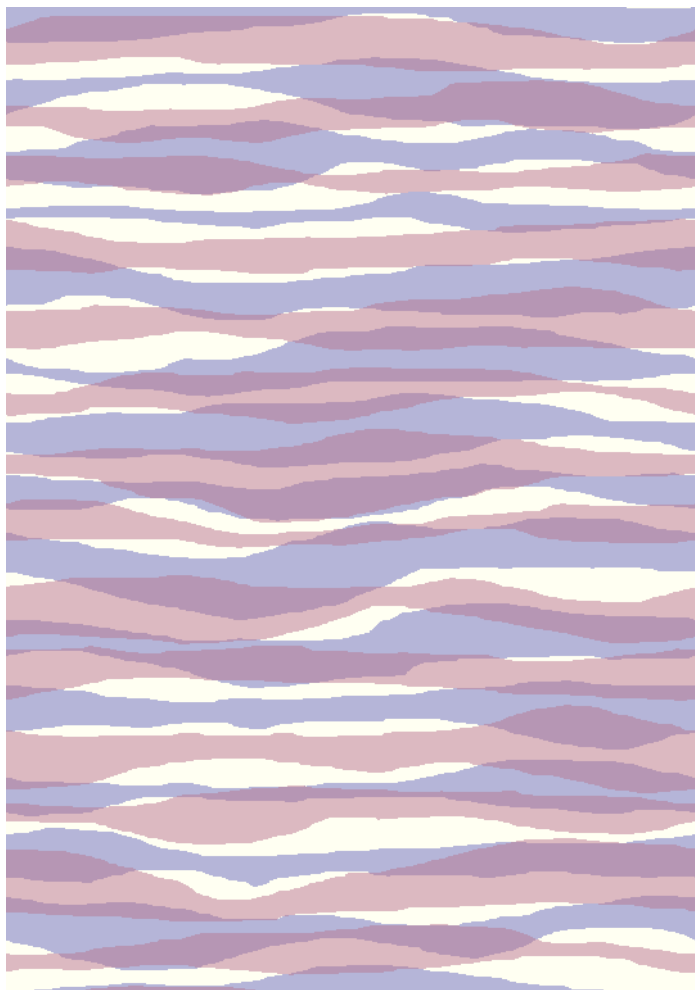
layering :

the overlapping motifs

For my fourth research, I examined the overlapping motifs and the layers they can create on cloth. The sketch was one of the first ones I created by gluing overlapping silk paper strips together. Preparing the design for the production was quite challenging and time-consuming. It required many steps in order to define the length of the floats for each overlapping motif. Creating the layering effect required working with layers throughout the process. The other challenge was choosing the materials and avoiding the material costs to rise too high. To avoid this, I designed the arrangement of weft yarns so that I did not use the double supplementary weft after every ground weave. Rather, I arranged both supplementary wefts one at a time after each weave for the ground. By doing this I was able to save on the yarn consumption.

I could have made more variations of this design by playing with colours. Eventually, the cloth was not fascinating enough to continue with, although the idea of overlapping motifs and material choices worked well. Lodetex had quite a similar design in their collection, therefore I decided to continue with new and more fascinating experiments.

layering : ▯



Disegno 22686

material: 100% PES
loom: Rita white (328 cm)
repeat: 105 cm 150 cm

Figure 31a. Pattern repeat design in EAT
Figure 31b. (*facing page*) Fabric design 22686





Figure 32. 3d: sketch and fabric

3d :

the functionality of the 3D surface

During my fifth research, I focused deeper on the construction of the cloth and probed on the structure and the functionality of the three-dimensional woven surface. I got an idea for this design from a little piece of fabric I saw on Fabrizio's desk. I realized, that the sample was clipped and when I stretched it, the surface transformed into a bold three-dimensional shape. Right away, I wanted to examine the structure of the cloth and asked more about it from Fabrizio. He had designed the sample two years ago on the basis of a non-woven sample that he had acquired from a textile fair. He had developed the structure for weaving and after clipping it, it functioned well. However, during his first trials he did not achieve a very beautiful appearance. With Fabrizio's help and agreement I took on this wonderful idea of structure and improved the aesthetic properties of the design.

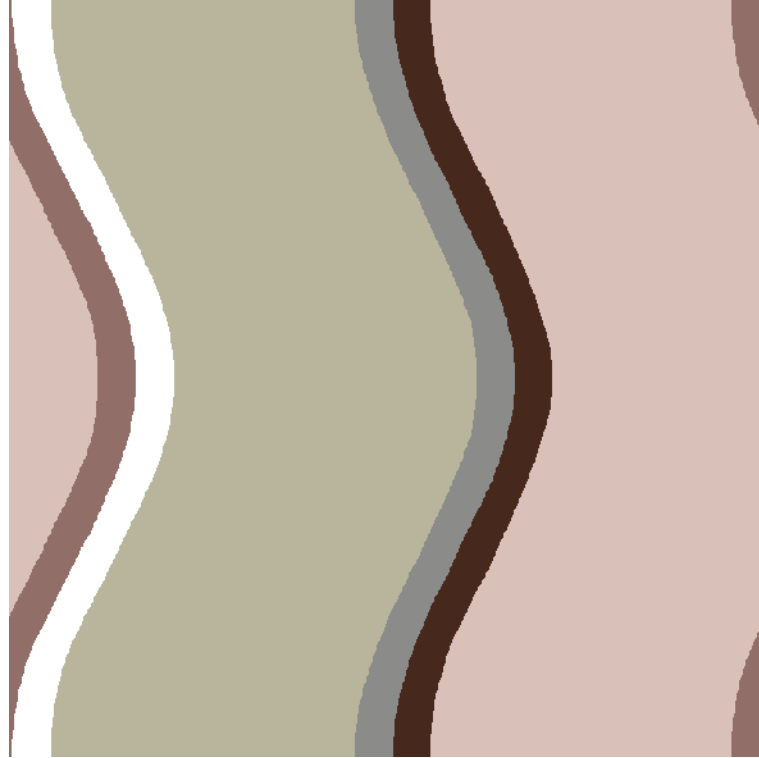
I studied the structure of the cloth and its technical file in EAT. In Fabrizio's design, the warp formed three distinct layers and the floats occurred on the top. I created a new handmade sketch and developed the structure considering the aesthetic properties of the design. In my design, the floats occurred not only on the top of the cloth but also in a pocket between two layers of ground fabric. I made two versions with a similar structure but with different materials. In both of the designs, I made a mistake with one binding.

The mistake was realized later after a few weeks, when the first variation of fabric was woven and returned from clipping. The other variation was still waiting for weaving, so I managed to correct my mistake in the design before weaving it. It is not always possible to perceive all mistakes while weaving the fabric on the loom, because the floats occur on the top of the interwoven structure.

Along with these two versions I wanted to try digital printing on a similar structure. Hence, I developed Fabrizio's original sample by choosing softer yarns for the weaving. My idea was to choose light and transparent weft yarns for the front layer of the ground and soft white weft yarns for the layers in the middle of the fabric. This would make the print appear stronger in the middle layer and more transparent on the front layer. I was interested to see how the print transformed, when the fabric was stretched to its bold three-dimensional form.

All three variations of this one idea worked well on the final fabrics. Although, one of the versions included the mistake in the binding, the fabric looked good and was chosen for Lodetex's Heimtextil 2015 collection. The function of the three-dimensional woven surfaces could be improved further. For instance, the functionality of these cloths could work nicely in window blinds or as clothing fabrics.

30 : I & II



Disegno 22713

material: PES / LINEN
loom: Sara black
repeat: 10 cm x 10 cm

Disegno 22714

material: PES / LINEN
loom: Sara white
repeat: 10 cm x 10 cm

Figure 33a. Pattern repeat design in EAT

Figure 33b. (*facing page*) Fabric design 22713





3D 3:
Disegno 22707 with print 40808 v1

print repeat: 150 cm x 330 cm
material: 100% CS
loom: Sara white
repeat: 10 cm x 4 cm

Figure 34a. Detail of print 40808 v1
Figure 34b. Pattern repeat design in EAT
Figure 34c. (*facing page*) Fabric design 22707
with print 40808 v1





free floating :

the floating weft in the pocket

For my sixth research, I was inspired by the 3d design and started to explore freely floating wefts in the pocket. I had a clear vision of the cloth, in which the weft floated loosely and supply between two layers. This fabric was not clipped, because the supplementary weft traveled in the pocket from selvage to selvage. I combined various materials with linen and added shiny lurex as an accent to bring out the sumptuous sparkling inside the cloth. The appearance of the final fabric was fascinating and conveyed well with my idea and original vision the of cloth. It also metaphorically delivered the brightening shine after rain.

The price of the first version settled into a higher price category, therefore I designed the second one as a more affordable version of the same design. I chose more inexpensive materials for the weft yarns and replaced lurex with other shiny materials.

Figure 35. Free floating: sketch and fabric

free floating : ■ & ■■



Disegno 22731

material: PES / LINEN
loom: Viola I
repeat: 10 cm x 10 cm

Disegno 22753

material: PES / LINEN
loom: Viola I
repeat: 10 cm x 10 cm

Figure 36a. Pattern repeat design in EAT

Figure 36b. (*facing page*) Fabric design 22731





Figure 37. Mineral Mosaic sketches



Figure 38. Shine and transparency: sketch and fabric

shine and transparency :

the variety in scale and material

For my seventh research, I moved on to the Mineral Mosaic sketches, and examined the shine and transparency of clipped cloth. After some research, I returned back to the basics with more simple constructions of the cloth and started playing with the variety in scale and material instead.

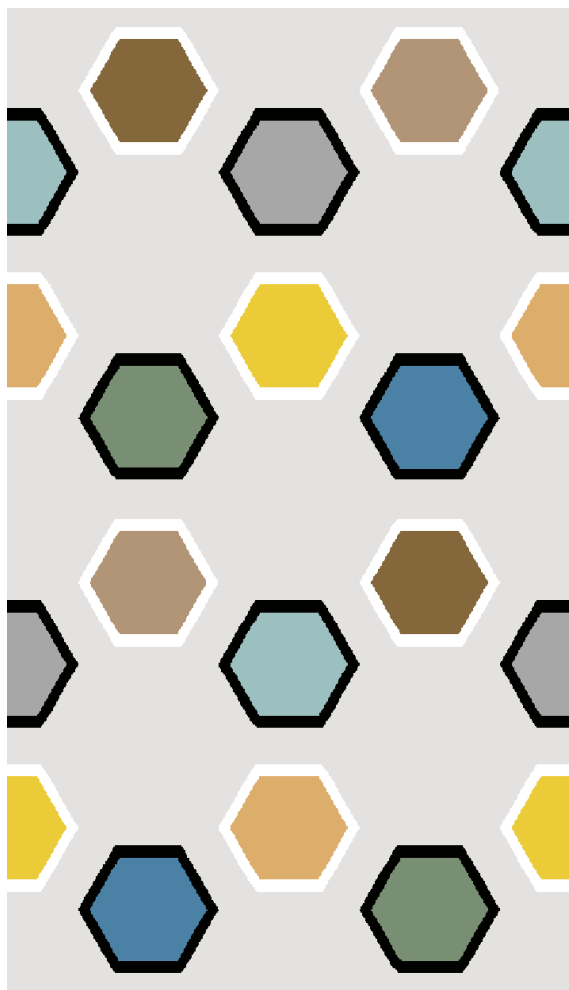
I prepared the first design on the basis of my sketch and chose transparent yarns for the ground and thicker and metallic materials for the motifs. I used different bindings and colours and applied the double supplementary weft discontinuously in height only in areas where it was required. The final fabric of the first design comports well with the original sketch (fig. 38.) when it comes to shine and transparency but I could have made better material choices. The long pills occur on the edges of the motifs, because clipping the thicker yarns was more challenging with the machines.

For the second version (fig. 40b.), I took influence from velvet structure. During my meeting with Vibe, I learned that a velvet kind of structure can also be achieved with the weft. I did not really know how the idea of this structure worked in practice but I decided to try what I can create with fringed pills. I used matte and shiny yarns, in which the pill opens when it is clipped. The appearance of the fabric is not the most beautiful but the idea of a fuzzy structure in the motifs is some-

thing to continue to improve.

For the third version (fig. 41b.), I scaled the design much bigger. I chose linen and viscose and applied a function of *la trame liserée* i.e. the weft alternates as a ground and supplementary weft. I used a similar structure for the motifs, as I used for the bindings in the first variation. The appearance of the second version is beautiful and very suitable for Lodetex's natural furnishing fabric collection. The design, materials and the structure of the cloth work extremely well together.

shine and transparency : ▯



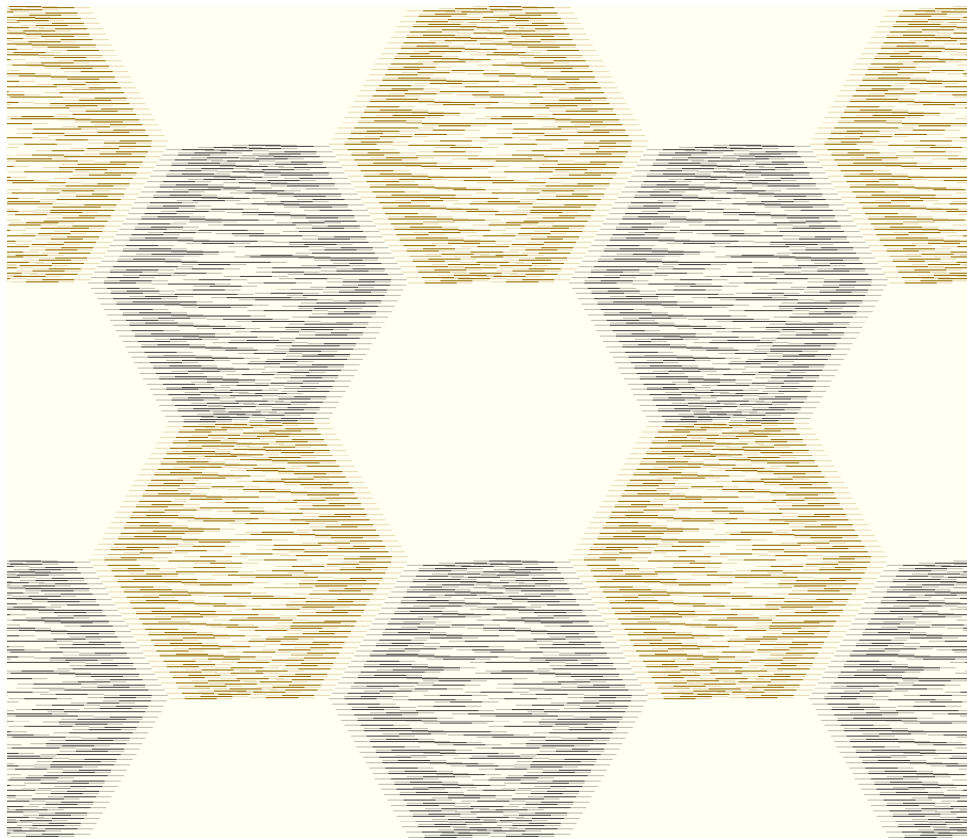
Disegno 22705

material: PES / LINEN
loom: Rita black
repeat: 12 cm x 21 cm

Figure 39a. Pattern repeat design in EAT
Figure 39b. (*facing page*) Fabric design 22705



shine and transparency : ☐☐



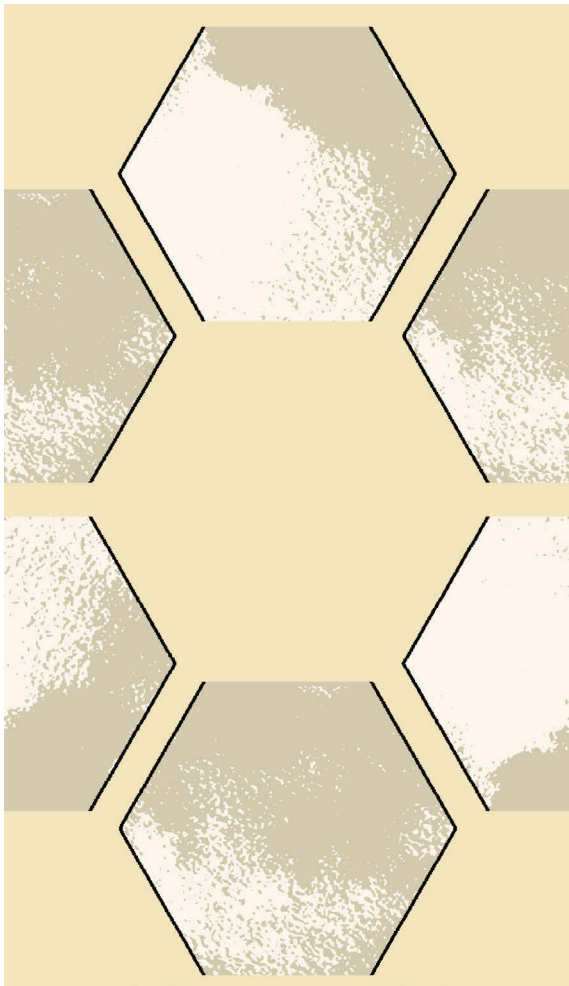
Disegno 22726

material: PES / VISCOSE / COTTON
loom: Rita white
repeat: 30 cm x 26 cm

Figure 40a. Pattern repeat design in EAT
Figure 40b. (*facing page*) Fabric design 22726



shine and transparency : 000



Disegno 22722

material: LINEN / VISCOSE
loom: Iris I
repeat: 66 cm x 116 cm

Figure 41a. Pattern repeat design in EAT
Figure 41b. (*facing page*) Fabric design 22722





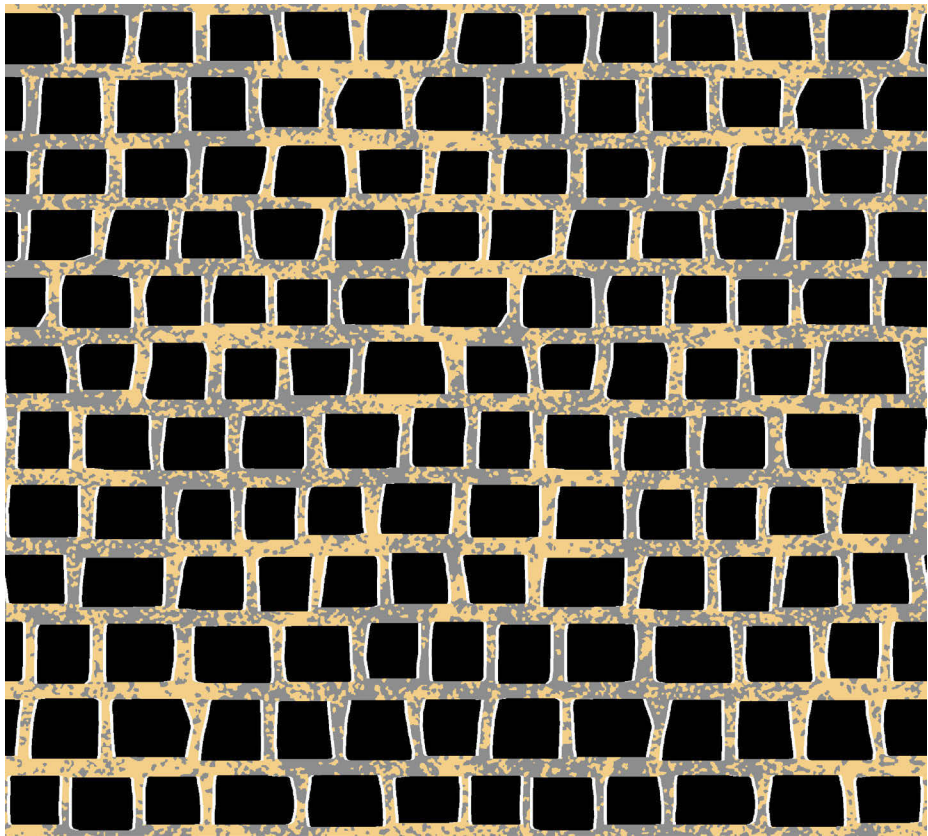
Figure 42. Clip and shrink sketch and fabric

clip and shrink :

the use of the special material

For my eighth research, I explored how the special materials act after clipping. After clipping, the fabric is treated by washing. This accomplishes the shrinking effect of the cloth. In both designs, I used shrinking yarn as a supplementary weft and created two versions on the basis of my sketch, positive and negative. In the first version (fig. 43a–b.), I added a structural pattern to the design and used a double face structure. In the second version (44a–b.), I scaled the design a bit smaller and applied a double supplementary weft. I designed the colour variety in the motifs by playing with the arrangement of the weft yarns. I used silver and gold colours as a contrast to the black ground for both designs.

clip and shrink : □



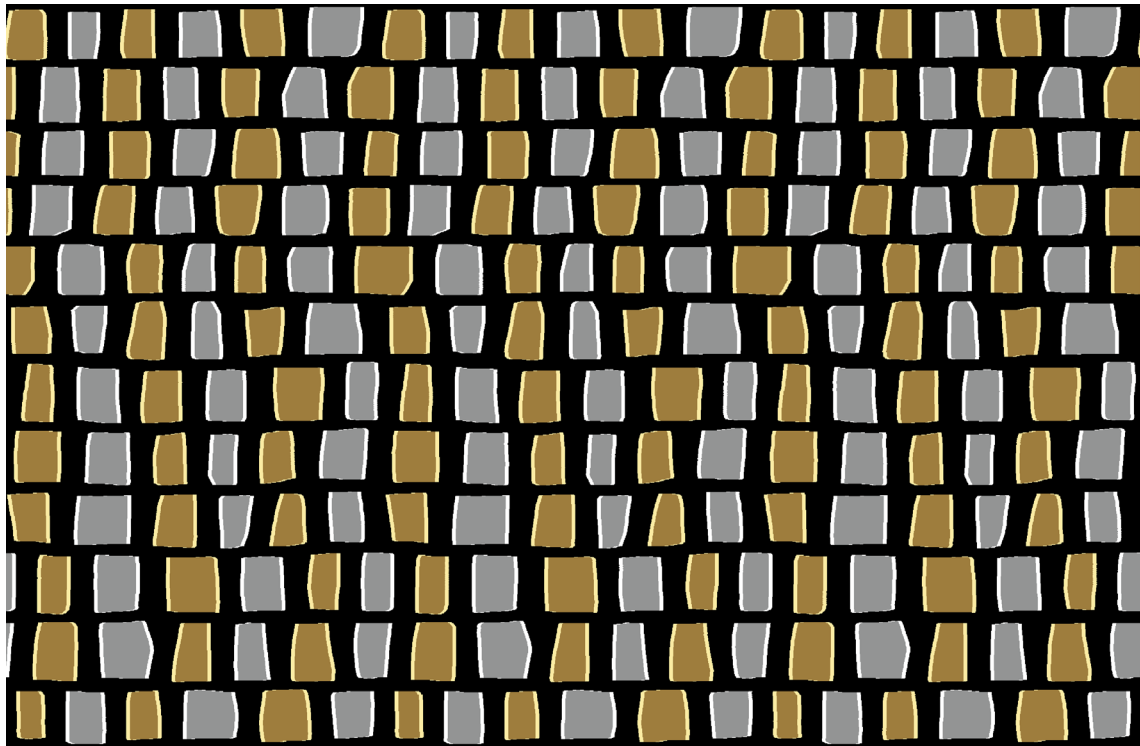
Disegno 22755

material: 100% CS
loom: Rita black
repeat: 60 cm x 57 cm

Figure 43a. Pattern repeat design in EAT
Figure 43b. (facing page) Fabric design 22755



clip and shrink : □□



Disegno 22754

material: PES / COTTON
loom: Rita black
repeat: 60 cm x 38 cm

Figure 44a. Pattern repeat design in EAT
Figure 44b. (*facing page*) Fabric design 22754





Figure 45. Fortuitous challenge: sketch and fabric

fortuitous challenge :

the variety in scale, material and structure

For my ninth and last research, I decided to set my abstract thinking to the test and moved on to the last challenge. Even small changes in material or structure of the design can affect the appearance of the cloth. I decided to try how distinct versions I can create on the basis of one sketch. I explored the pattern by varying scale, material, colour and structure. All three variations required the use of supplementary weft discontinuously in height.

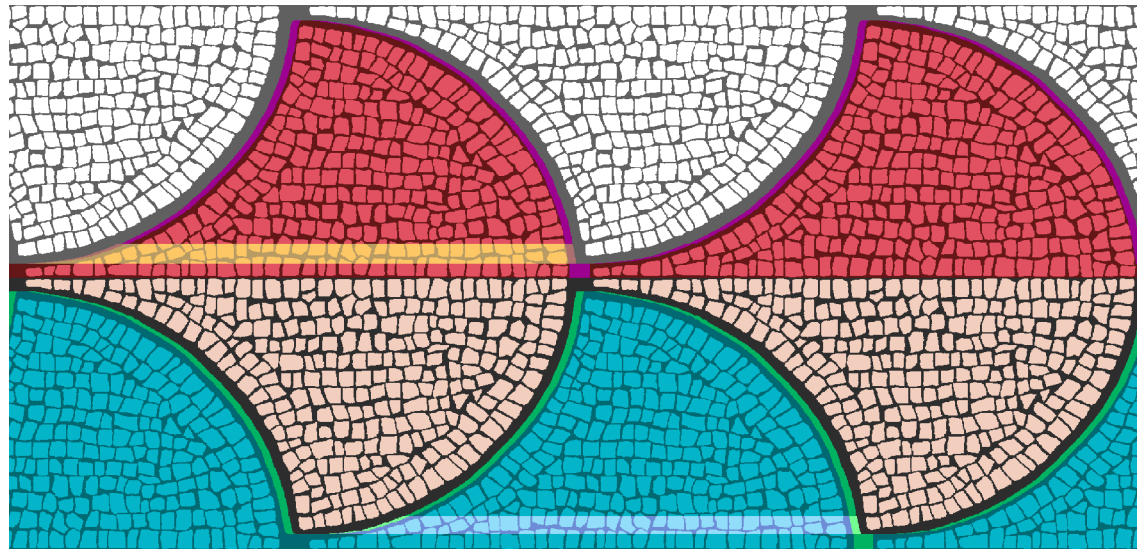
I designed the first version (fig. 46b.) on the basis of my sketch where the weft forms the patterning between transparent layers. I used a pocket weave structure in this design. In addition, I added minor pattern to the ground fabric by binding. (fig. 46a.) I used matte and shiny yarns in burgundy and turquoise and chose transparent yarn for the ground. Unfortunately it turned out that my idea did not work very well in practice. I had designed a too small area for the plain weave structure which led to the floating yarns moving and escaping from the ground into the pocket. Neither appeared the pattern of ground fabric on cloth. However, I could have developed this mistake and created designs, in where unravelling wefts inside the pockets create the effect on the cloth.

For the second version (fig. 47a–b.), I scaled the design bigger and edited the pattern. I chose similar colours for the weft, green and burgundy.

The quality of the final fabric responded to Lode-tex's requirements but aesthetically I did not find this design very fascinating.

For the third version (fig. 48a–b.), I scaled the design again and selected white and gold viscose yarn with linen and created the design with fringe pills on the edges of the motifs. The outcome of the cloth was weird, yet delightful and surprising. The style of the fabric is something new for my own artistic handprint and the style is not typical to Lodetex either.

fortuitous challenge : ¶



Disegno 22746

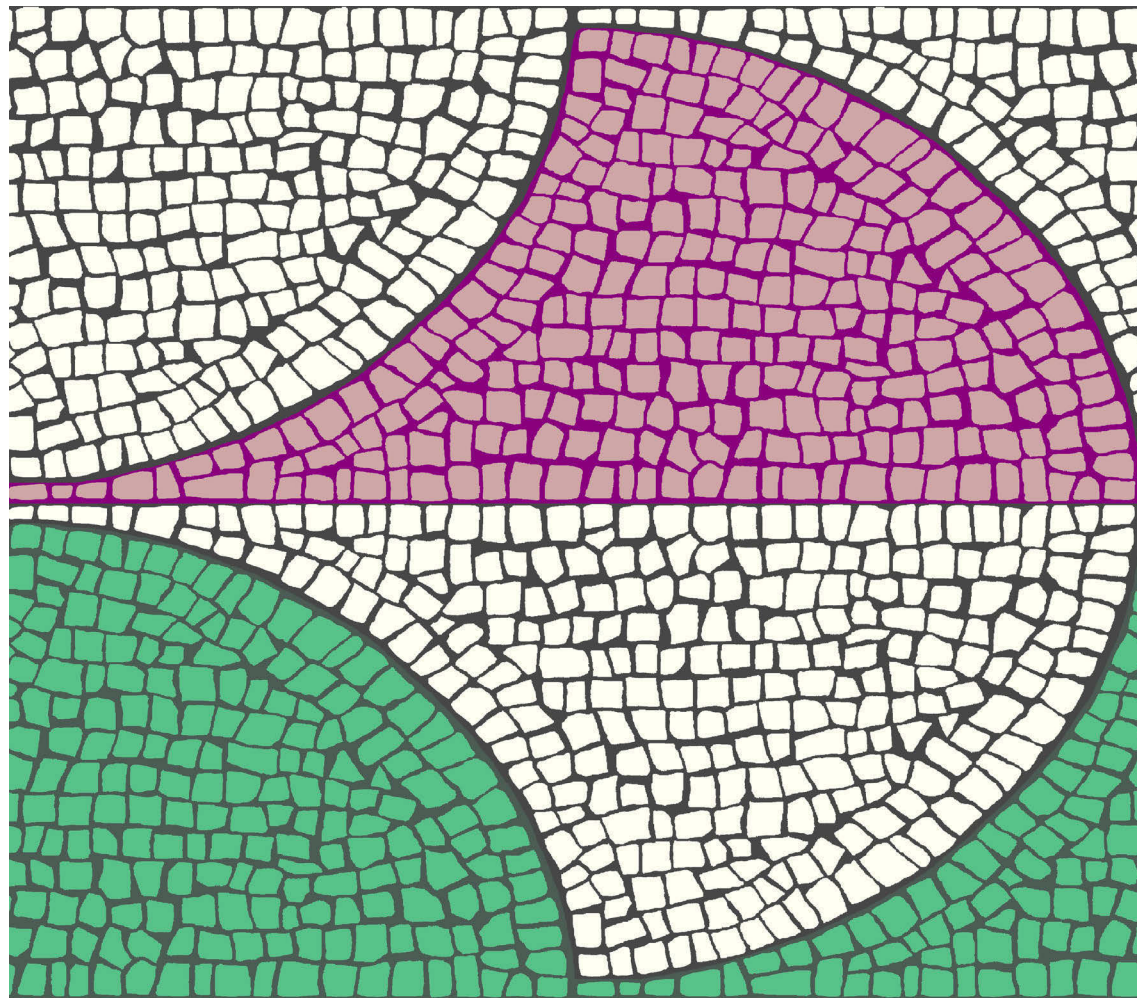
material: 100% PES
loom: Sara white
repeat: 30 cm x 14 cm

Figure 46a. Pattern repeat design in EAT

Figure 46b. (*facing page*) Fabric design 22746



fortuitous challenge : []



Disegno 22750

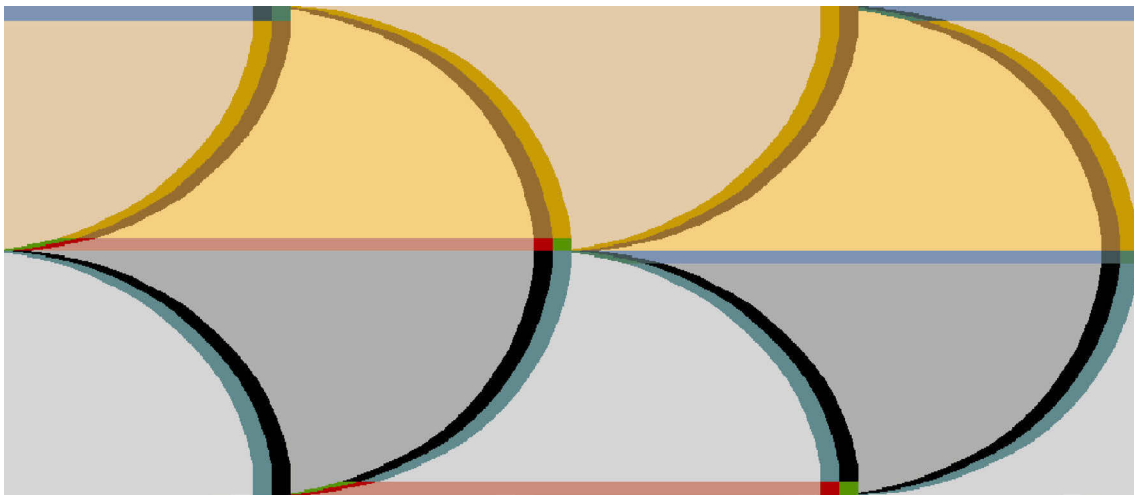
material: 100% CS
loom: Sara black
repeat: 60 cm x 55 cm

Figure 47a. Pattern repeat design in EAT

Figure 47b. (*facing page*) Fabric design 22750



fortuitous challenge : 000



Disegno 22752

material: LINEN / VISCOSE
loom: Iris I
repeat: 66 cm x 29 cm

Figure 48a. Pattern repeat design in EAT

Figure 48b. (*facing page*) Fabric design 22752



Summary II

This second chapter provided the description of the design case: Floating and Clipping. It reviewed the background for the design concept and presented the design process by providing beneficial knowledge of designing clipped fabric designs. The chapter focused on searching the answer to the second and third research question:

- 2. *What are the phases of production and the requirements in weaving and finishing of clipped fabrics?*
- 3. *How can new ideas be evolved from a technique and adapted into industrial production?*

Designing clipped cloths requires certain knowledge about the phases and the requirements of the production. The phases of production consists of designing, weaving and finishing. The production process sets certain requirements but offers beneficial opportunities for a designer as well. The most crucial requirement for industrially manufactured clipped fabrics is the placement of the plain weave and float. The plain weave on the edges of motifs ensures that the yarn does not move or unravel from the ground and thus produce imperfections in the patterning. The longest floats needs to occur on the top while weaving, so that they roll to the inside of the beam of the loom and do not brake as easily during transportation. By understanding the function of the weft series and the double supplementary weft helps the designer in his or her creative work of art and provides more latitude for industrial designing. Other requirements, such as the length of the float, depends on the facility of the weaving mills and the finishing companies. As for all industrially manufactured fabrics, there are certain requirements in the quality of materials and structures that have to be met regarding the use of the product. Contract textiles require flame retardant quality and durability, whereas clothing fabrics and home textiles do not require fire resistance. A designer needs to consider the use of the fabric while choosing materials and designing the structures.

New ideas for clipped cloths can be evolved various ways by using sketching methods and creating an idea portfolio. In the beginning of a design process, creating the themes and a mood board provides a good starting point for getting inspired with visual inputs. These visual implements support the birth of ideas from a technique. In order to concretize ideas, all kind of handcraft and ways of working can be experienced in artistic expression. During a design process, learning from practice helps to improve ideas, evaluate them and develop designs into industrial production. When adapting the ideas into production, teamwork with experts assisting the designer in choosing, building and evaluating the weaves, materials and structures ensures a good outcome.



Figure 49. *Floating & Clipping*

Chapter III

IDEA COLLECTION : *floating & clipping*

The third chapter presents and evaluates the idea collection. My *Floating & Clipping* idea collection provides new ways of thinking when it comes to clipped designs. The ideas that evolved from the technique and the sketches, generate the idea collection of clipped cloths.

The feedback from Lodetex was greatly appreciated. In Marie's opinion, my designs were interesting, saleable and commercial although some of the designs could still be improved. She thought the appearance of the collection was special and does not make you feel tired. She also pointed out, that even the mistake in the three-dimensional cloth provided new ways of thinking and the cloth was still interesting with its hairy pills. Luca stated, that the overall look of the designs was good and beautiful and that it could also be developed further. For example, in some designs materials and bindings could be something else. Alberto found that the designs were nice and simple. He thought they were interesting but not too crazy. Everybody especially appreciated the free floating design (fig. 50.). They liked the idea and now they are developing it polyester. They have chosen a new white

polyester version of the design to be one of the 12 designs in their new piece dyed collection.

In order to consist the final presentation and idea collection of the woven fabrics, I evaluated three distinct properties of each fabric: The idea, the quality and the aesthetic. I evaluated the properties with Lodetex's feedback in mind and through my own opinions. The interesting structure of the cloth is a important factor when it comes to the novelty of an idea. If an interwoven structure forms an innovative surface, the design can be developed further by testing different combinations of the materials or the colours. Lodetex's clients can request different versions of one design. The quality of the cloth defines its durability in use and makes sure that the yarns do not move or unravel. The long floats may be unpractical in use but on the contrary they provide an aesthetic unique look. The aesthetic is a very subjective property. In this design case, I agreed with the feedback I got from Lodetex and from their clients. I experienced the same particular designs more aesthetic than others.

Eventually, Lodetex's clients were fascinated

with the same cloths that I chose to present in my idea collection. Textile editors in the UK, US and Asia have especially appreciated the linen designs. The European editors have liked the more light and transparent designs. Lodetex is developing the designs with regard to their clients' requests and one of my designs is already sold to an Italian textile editor. The feedback on my idea collection can be summarized by Marie's words: "Your designs have been appreciated by a broad range of very different clients. You can be very proud."

The idea collection *Floating & Clipping* is presented in detailed images in a separate portfolio book.



Figure 50. *Floating & Clipping*



Figure 51. *Floating & Clipping*

CONCLUSION

When summing up the main points in this thesis you may say that the intersection of knowledge, material thinking, experience and creative work have all affected the outcome of this study.

Working with professional people at Lode-tex and visiting Vibe has provided me with deep knowledge and understanding in designing fantastic samples of clipped cloth. In handcraft weaving the designer is often in the role of an artist and a weaver. During a process like this, the designer has lots of freedom and opportunities to explore the loom and the materials as well as his or her skills in weaving and artistic expression. During an industrial weaving process, the basic principles are the same but the weaving mill facilities not only set up certain limits but also open up new opportunities for weaving.

Real discontinues brocades were woven with precious materials and brocading was used to conserve the use of material and to avoid adding extra weight on the fabric. Nevertheless, considering brocading and clipped fabrics of today, there are a few differences compared to the past concerning weaving technique and material consumption.

Clipping today is not used for conserving the material consumption, rather it is used to add value by a highly decorated appearance of the cloth. Finishing by clipping is necessary to achieve the unique look of the cloth. The treatment simultaneously often increases the costs in manufacturing and produces leftovers from the threads that have been cut. However, while weaving the fabric, these threads are a crucial part to forming the structure. Thus, the development of clipped cloths – also in industrial manufacturing – may be considered as a work of art. Sometimes the work of art requires misplacing in order to create the complete ensemble.

The technical understanding of the phases and the requirements of production play a significant role to the designer. In addition, it effects not only the essence of the fabric but it also affects the price of the fabric. The purpose of industrially designed fabric is to sell and thus to provide new insights and useful aesthetic to its consumer. From the business point of view, the companies benefit from quality design development and innovations. My artistic expression, knowledge in weaving and

team work with the experts have significantly affected the look, feel and functionality of the final collection of my design ideas.

In this study, the practice-led research method comports well with the experimental design process. The collaboration provided valuable knowledge to me as a designer and allowed me to learn and share experiences with experts. I provided novelty ideas and fabric designs to the weaving mill and deepened my skills as a designer. Researching historical data and considering the position of the present market brought a profound understanding to the topic. Thus, the design development process of clipped cloths meets its context in the past, present and future.

The relevance of this study is in providing the technical knowledge, describing the creative process and offering new fabric designs. Many weaving books offer ideas and weaving techniques but they lack information about the industrial manufacturing of clipped cloths. The major part of this research was to evolve new ideas by practice, develop them into the design and production process and to provide new information about weaving and finishing of clipped designs. Documenting the research process and theorizing the data indicates the purpose of this study. I think, I could proudly present my study even to Li Edelkoort and diminish her fears concerning the extinction of profound knowledge about cloth and its form. There are still designers who are fascinated about understanding the structure and manufacturing of cloth, instead of dreaming about – as Edelkoort expresses – “to become catwalk designers, highly individual stars and divas, to be discovered by luxury brands” (Edelkoort 2015. Dezeem). Like in the past, designers need technical understanding, skills in artistic expression and the ability to perceive evolving trends and thus respond to the markets’ demands.

I got good feedback regarding my idea portfolio of the sketches and the idea collection of the fabric designs. The people at Lodetex appreciated the beautiful designs and the new way of thinking about clipped designs. They found my designs interesting, saleable and commercial. Lodetex has sold one of my fabric designs and they are developing many of my designs for certain textile editors operating in the field of fashion or furnishing.

The limitations of this study are in the use of the final products and the sustainable development. Considering the amount of waste that the textile industry provides, it is difficult to define an industrial textile designer as a convincing artist without considering the ecological aspects of the industry. This study does not provide any solutions for sustainable design development of textile industry. Rather it points out, that industrial textile design and the development of new experimental solutions is a creative practice. I have not considered the use of the final fabrics because the goal was to design the idea collection of the fabrics for multiple purposes. This decision corresponds with the position in where Lodetex operates i.e. the company invests in technology, product development and professionalism of employers and wants to provide innovative and experimental techniques, materials and fabrics to their various clients.

The abstract thinking and designing the fabric without sampling it on the loom was challenging to me. Nevertheless, the idea portfolio assisted me in overcoming this challenge. Summing up, the greatest challenges I confronted during the process relate mostly to the external issues of the actual design process e.g. finding the relevant literature, keeping to the schedule and the topic as well as writing the thesis in English. I thought literature about clipped cloths was nonexistent until I realized that the term ‘brocading’ was the keyword to success. The learning process required more time than I had estimated and the topic was more challenging than I had imagined in the beginning. This study operates in a very specific discipline but through the history and markets the topic spread into more wider spheres. In addition, expressing and describing the whole process and my thoughts in English required extremely dedicated investment from me to the project. Although, during the challenging phases, I found the motivation from the creative work of art and from those insightful moments when I learned something new, whether it was a new, next step in EAT or the new, next movement while climbing. After each step, I dared to try a more challenging one. And what if I failed and fell? Surely there is the belay on the ground, holding and controlling the rope for me. The participation on ground lets me float and avoid the cuts.

As the result of my findings, this study states the various opportunities when designing clipped cloths. My next step would be the professional designing of clipped designs. I would continue my learning process by exploring and applying other clipping methods along with basic clipping. My experience with various sketching methods provided me with great tools for artistic expression. The theme Botanical Garden could serve as the next starting point and I could develop the designs further with the material, colour, structure and clipping method. I hope I could continue working in collaboration with Lodetex and Vibe. This kind of opportunity would be a viable continuum for my thesis.

My master’s thesis Floating and Clipping studies textiles using weft floats and finishing of fabrics by clipping. I developed my sketching methods of designing clipped fabrics. I created an idea portfolio to demonstrate the appearance of this type of cloth. The purpose of my thesis was to examine the application of the idea portfolio into industrial manufacturing of woven textile. The idea portfolio supported the dialogue between me, a design coordinator and the technicians. The study examined the industrial production process and finishings of clipped fabrics, mapped out the *fil coupé* fabrics in fashion and furnishing markets and provided a historical review of brocading and figured weaving with floats.

Considering the woven textiles and the different finishing methods for these fabrics, the aesthetic values and the technical skills play a significant role in both. The aesthetic and the technique advance hand in hand. Anyone with creativity can perceive a beautiful design without knowing how to produce it and anyone with great technical skills can create an elaborate structure of fabric without being familiar with visual artistic skills. When managing both aspects, we end up mastering weave structures – the art of weaving. Undeniably, the textiles are still considered a work of art.



Figure 52. *Floating & Clipping*

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Idea Collection

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Idea Collection

Tiina Paavilainen

Master of Arts Thesis

Textile Art and Design

Aalto University

School of Arts, Design and Architecture

2015







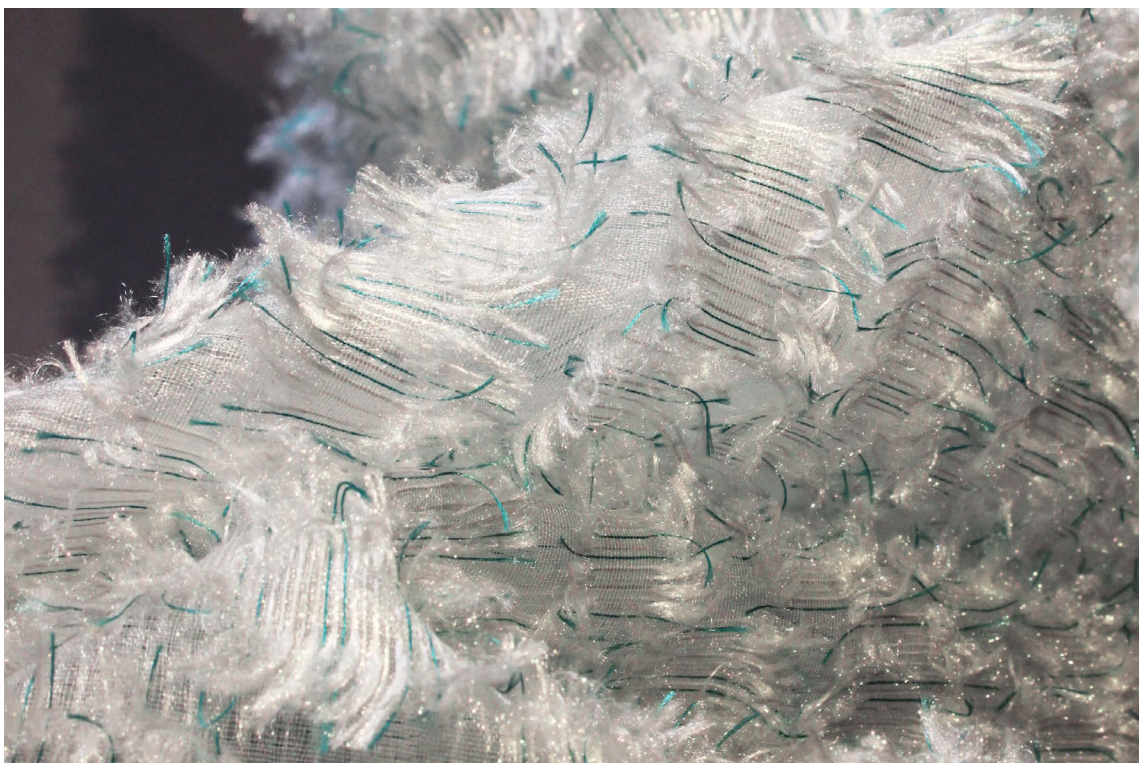
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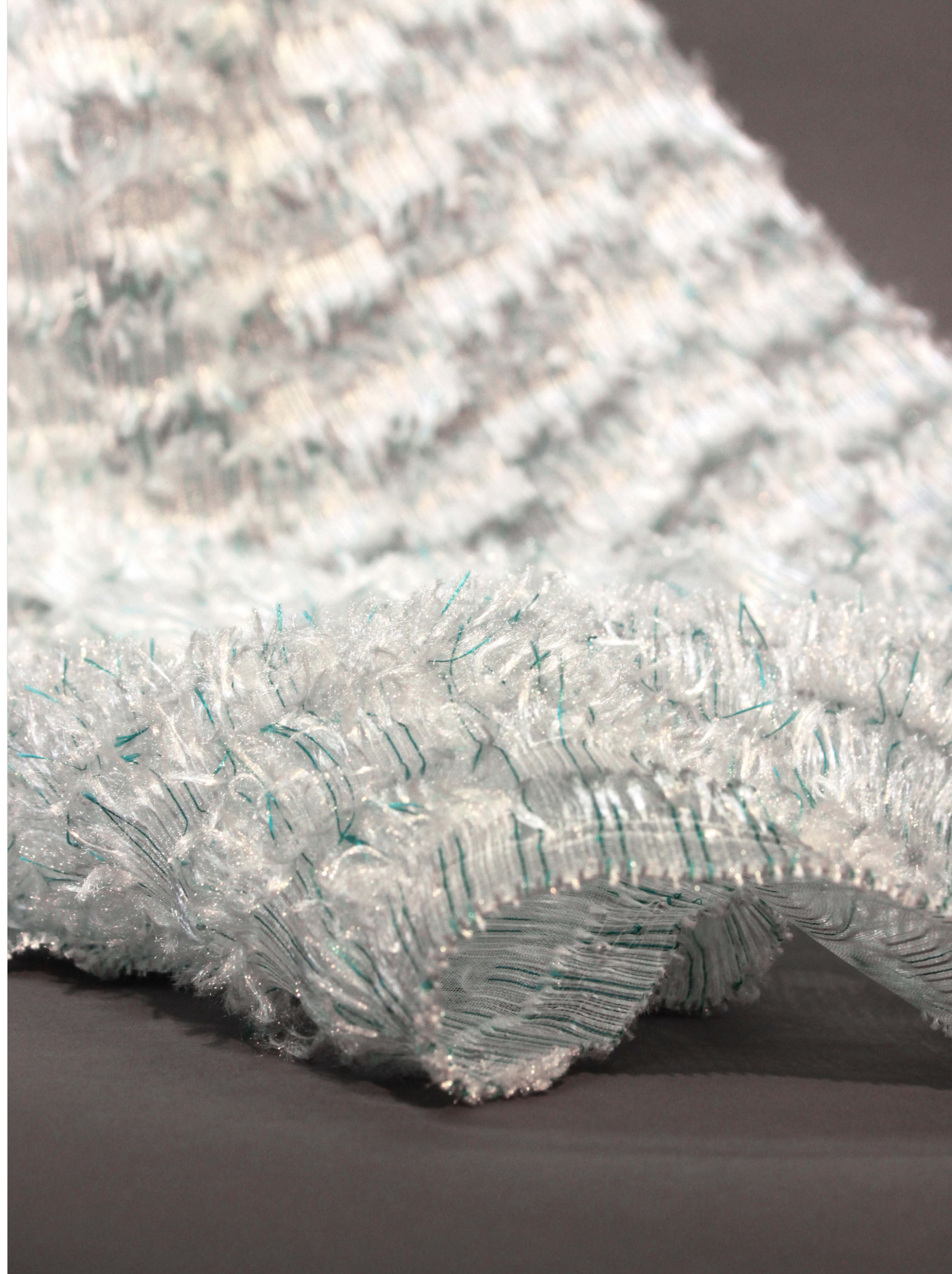


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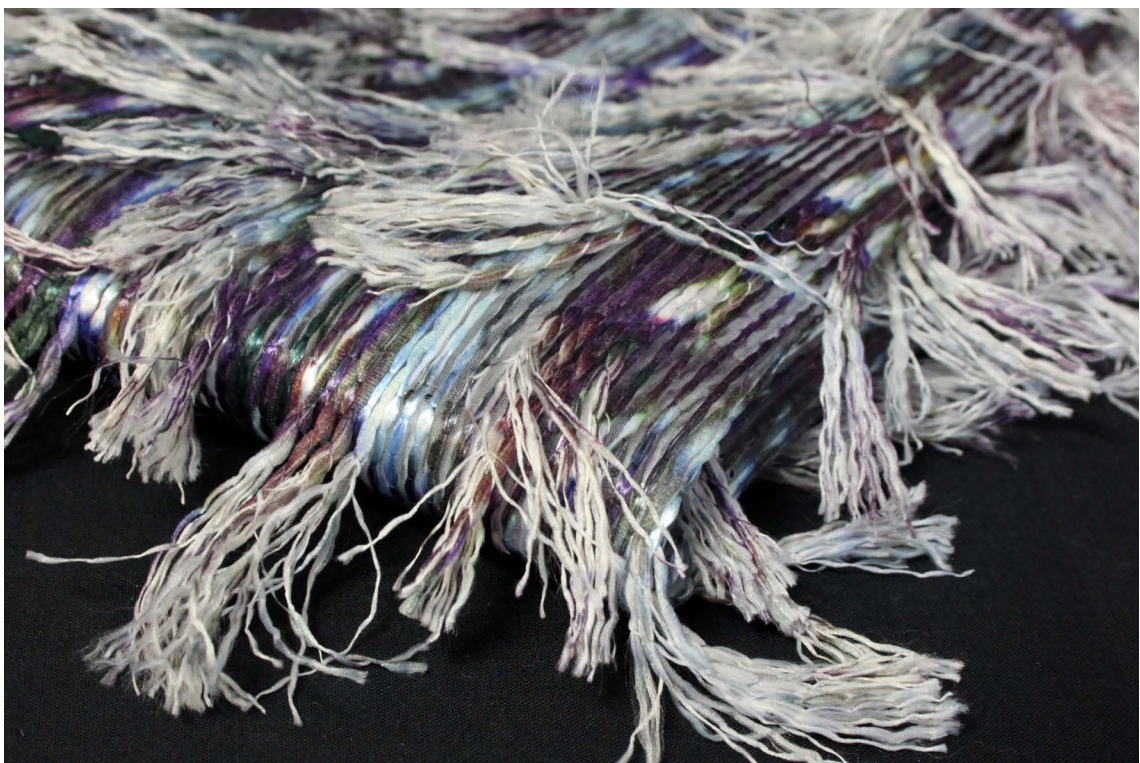






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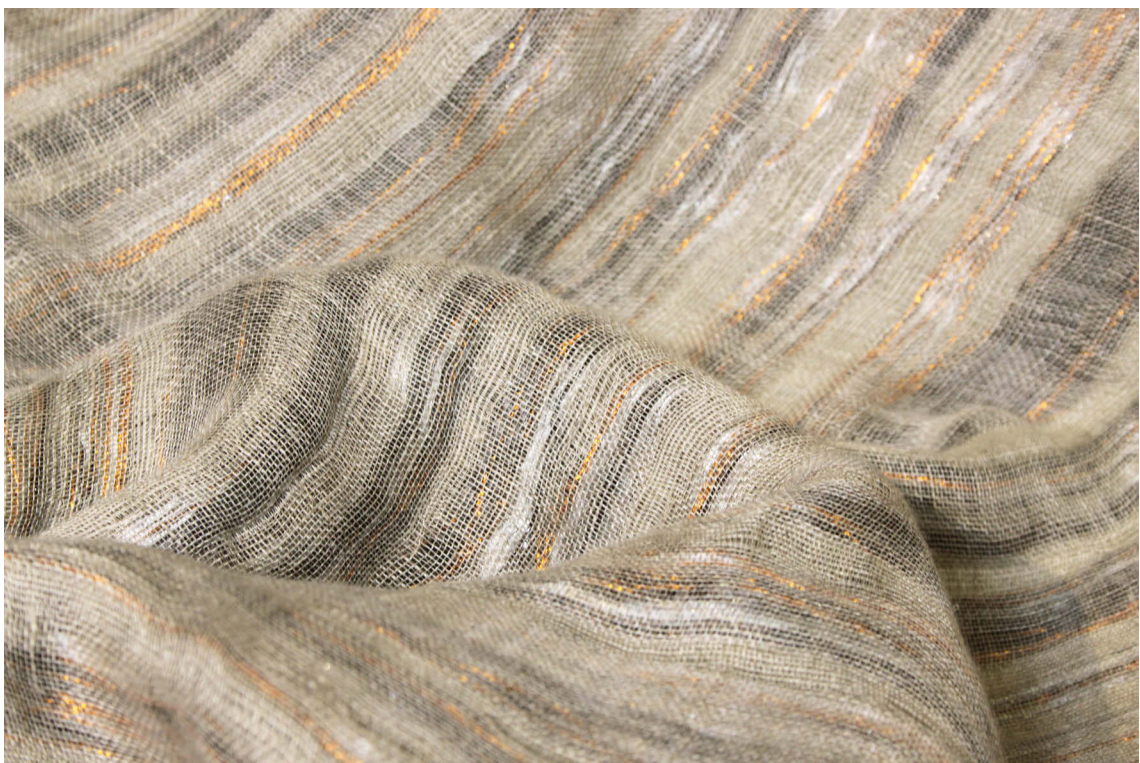






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floating & CLIPPING

Tiina Paavilainen 2015



Author Tiina Paavilainen		
Title of thesis Floating and Clipping – Woven textiles with weft floats and finishings by clipping		
Department Department of Design		
Degree programme Degree programme of Textile Art and Design		
Year 2015	Number of pages 134	Language English
<p>This thesis reviews woven textiles using weft floats and finishings of the fabrics by clipping. The study examines the industrial production process and finishings of clipped fabrics, maps out the fil coupé fabrics in fashion and furnishing markets and provides a historical review of brocading and figured weaving with floats. The purpose of the thesis is to examine the application of the idea portfolio into industrial manufacturing of woven textiles. The design development process takes place in collaboration with the Italian weaving mill Lodetex and meets its context in the past, present and future.</p> <p>The practice-led research method of this study is to develop sketching methods for designing clipped fabrics and to create an idea portfolio in order to demonstrate the appearance of this type of cloth. The idea portfolio supports the dialogue between a designer and the technicians in a design case. The study describes how to concretise a fabric design by producing a handmade sketch and how to improve the design onwards into industrial production.</p> <p>Researching historical data and considering the position of the present market brought a profound understanding to the topic. Considering brocading in the past and clipped fabrics of today, there are few differences. Brocading has been used for conserving the material consumptions. Clipping today is used to add value by a highly decorated appearance of the cloth.</p> <p>The thesis provides the technical knowledge, describes the creative process and offers new fabric designs to Lodetex. The collaboration with the weaving mill and visiting the finishing company provided valuable knowledge. The weaving mill and the finishing facilities not only set up certain limits but also opened up new opportunities for weaving. The skills in abstract thinking and the technical understanding of the phases and the requirements of production play a significant role to the designer. The ideas that evolved from the technique and the sketches, generate the idea collection of clipped cloths. The idea collection provides new ways of thinking when it comes to clipped designs. The intersection of knowledge, material thinking, experience and creative work affected the outcome of the idea collection.</p> <p>This study states the various opportunities when designing clipped cloths. The development of clipped cloths in industrial manufacturing may be considered as a work of art. Considering the woven textiles and the different finishing methods for these fabrics, the aesthetic values and the technical skills play a significant role in both.</p>		
Keywords fil coupé, weft float, clipping, sketching method, jacquard weaving, textile finishing, Lodetex, Vibe, industrial textile manufacturing		



Tekijä Tiina Paavilainen

Työn nimi Floating and Clipping – Woven textiles with weft floats and finishings by clipping

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Kieli englanti

Opinnäyte tarkastelee teollisesti kudottuja fil coupé –kankaita ja niiden suunnitteluprosessia. Fil coupé –kankaiden kudonnassa käytetään kudelangon pitkiä lankajuoksuja, jotka leikataan kankaan viimeistyksessä. Rakenteellisista syistä kankaat kudotaan erillisellä pohjakuteella ja kuviokuteella, siksi suunnittelijan on ymmärrettävä näiden kuteiden toiminnallisuus kankaan suunnittelussa. Opinnäytteen tavoitteena on tutkia ideaportfolion avulla, miten kudontatekniikka synnyttää ideoita suunnittelussa sekä mitä vaiheita ja edellytyksiä tuotantoprosessiin liittyy. Opinnäyte selvittää fil coupe –kankaiden teollisia tuotantoprosesseja suunnittelussa, kudonnassa ja viimeistyksessä sekä kartoittaa fil coupé –tuotteita sisustuksessa ja muodissa. Se tarjoaa historiallisen katsauksen brokadikankaista ja brokadointimenetelmistä sekä niiden kehityksestä.

Practice-led –tutkimusmetodina on kehittää luonnostelutekniikoita ja suunnitella idea portfolio, joka toimii keskustelun avaajana ja työkaluna suunnittelijan ja kudontateknikon välillä. Opinnäyte esittelee, miten abstrakti idea muuntuu konkreettiseksi luonnokseksi ja tarkastelee, miten käsintehdyt luonnokset soveltuvat kudottujen kankaiden teollisiin tuotantoprosesseihin. Ideamalliston kangasmallit on kudottu jacquard-kutomona Lodetexilla Italiassa syksyllä 2014.

Brokadointia on käytetty kankaiden kuvioinnissa alun perin arvokkaan lankamateriaalin säästämiseksi. Nykyiset tekstiilien viimeistykset tuovat lisäarvoa tuotteelle. Materiaalien saatavuus ja teknologia mahdollistavat yhä nopeammat tuotantoprosessit. Fil coupé näkyy tämän päivän muodissa kasvavana trendinä. Kuvioitujen kankaiden kehitysvaiheiden kartoitus tuo syvyyttä aiheeseen ja auttaa suunnittelijaa arvioimaan omaa työtään ja sen merkitystä nykyisin.

Opinnäyte tarjoaa teknistä tietoa kuvioituista kudotuista kankaista, kuvaa luovaa prosessia ja tuottaa uusia kangasmalleja Lodetexille. Työskentely kutomossa ja vierailu tekstiiliviimeistykseen erikoistuneessa yrityksessä toivat arvokasta tietoa suunnittelijalle. Tuotantoprosessin vaiheet vaativat tiettyjä edellytyksiä fil coupé –kankaan suunnittelussa, mutta teolliset prosessit tuovat myös uusia mahdollisuuksia suunnitteluun. Tekninen osaaminen on tärkeä taito suunnittelijalle. Suunnittelussa syntyneet ideat ja idea portfolion mallit tuotettiin valmiiksi fil coupé –ideamallistoksi, joka tarjoaa uudenlaisia näkökulmia ja ajatuksia. Ideamallistossa yhdistyy tekninen tieto, materiaaliajattelu ja kokeellinen luova työ.

Opinnäyte esittää useita ideoita ja mahdollisuuksia fil coupé –kankaiden suunnitteluun ja osoittaa, että teollinen suunnittelu ja kankaan valmistus on taiteellista työtä, jossa yhdistyy suunnittelijan tekniset ja taiteelliset taidot.

Avainsanat fil coupé, kude, lankajuoksu, luonnostelutekniikka, jacquardkudonta, tekstiilien viimeistys, Lodetex, Vibe, teollinen tekstiilituotanto